Advanced Hydrologic Prediction Service
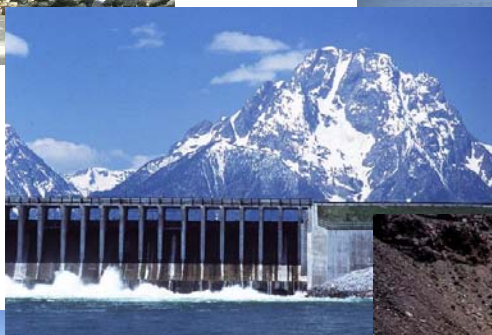# Quarterly Report
2nd Quarter FY 2007

March 31, 2007

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Flash Flood Services

National Basin Repository

Theme: Flash Flood Services

Management Lead: Ami Arthur, CIMMS and Ken Howard, NSSL

Objective: To create a National Basin Repository for the FFMP GIS dataset and provide data access through a web interface.

Milestones

Task	Due Date	Status
Establishment of the National Basin Repository computer server hardware and communications infrastructure	May 1,2005	Completed
Implementation of software for web interface to FFMP GIS dataset	July 31, 2005	Completed
Creation of a seamless hydrologically-connected FFMP basin and stream dataset for the United States, including Alaska, Hawaii, Puerto Rico, and Guam.	August 30,2005	Completed
Creation of instructions for users to download data and prepare it for localization in AWIPS.	Changed to June 30, 2007	Ongoing

Accomplishments/Actions

1st Quarter FY05
- Notification of funding availability not received until after first QR. No activities performed during first QR.

2nd Quarter FY05
- Progress has been made toward establishing hardware and communications infrastructure for the repository. The ESRI ArcIMS and Data Delivery Extension software for the web interface have been procured.
- NSSL continues to provide FFMP dataset technical support in the form of basin customization assistance and data delivery to various users.

3rd Quarter FY05
- The ESRI ArcIMS and Data Delivery Extension software have been installed. A few issues with the Data Delivery Extension are being worked out with the help of ESRI Technical Support.
- Creation of a seamless hydrologically-connected basin and stream dataset for the U.S. is underway.
- NSSL continues to provide FFMP dataset technical support. This quarter, varying degrees of assistance were provided to fill 15 requests for additional data and basin customization support.

4th Quarter FY05
- The Data Delivery Extension installation has been completed. Creation of the National Basin Repository website is in progress.
- The national seamless hydrologically-connected basin and stream dataset has been completed with the exception of a few areas where re-delineation was required. Previous errors of significance in these areas are being corrected using the improved elevation data that is now available. This will further improve the accuracy of the small basin boundaries and delineated streams.

1st Quarter FY06
- The National Basin Repository website for browsing the seamless stream and basin datasets has been created. The Data Delivery Extension is being configured for these datasets to allow user downloads in addition to browsing.

- Basins in the re-delineated areas (please refer to 4th Quarter activities) have been completed and incorporated into the CONUS seamless dataset. Basins in Alaska that were outside the originally delivered radar coverage areas are near completion and will be incorporated into the Alaska seamless dataset.
- NSSL continues to provide FFMP dataset technical support. This quarter, varying degrees of assistance were provided to fill 7 requests for additional data and basin customization support.

2nd Quarter FY06
- After several unsuccessful months of attempting to work out numerous problems associated with the Linux versions of ArcIMS and DDE, the decision was made to install the Windows versions instead. A new computer was purchased, and the Windows versions of ArcIMS and DDE were installed. These are now being configured for the national basin dataset, which is planned to be online by 15 May 2006.
- The Alaska basins that were outside the originally delivered radar coverage areas have been delineated. The seamless dataset for Alaska will be completed by the end of Q3.
- NSSL continues to provide FFMP dataset technical support. This quarter, assistance was provided to 10 WFOs and the CBRFC.

3rd Quarter FY06
- The National Basin Repository website for serving FFMP GIS datasets has been completed. It is currently being reviewed by NWS Headquarters and FFMP designers. After their review and approval, the website will be opened for access by NOAA and other government agencies.
- User instructions for requesting and using data from the National Basin Repository are being drafted.
- Additional progress was made on the Alaska seamless basin and stream dataset, which will be completed and made available through the National Basin Repository by 15 August 2006.
- NSSL continues to provide FFMP dataset technical support. This quarter, assistance was provided to 12 WFOs and the ABRFC.

4th Quarter FY06
- The seamless FFMP basin and stream datasets for Alaska have been completed.
- NWS Headquarters and FFMP designers have provided feedback regarding the National Basin Repository and web interface. To the extent possible, modifications will be made to incorporate their suggestions. This will likely be an iterative process, and the draft user instructions will be updated accordingly as changes are made.
- NSSL continues to provide FFMP dataset technical support to numerous WFOs.

1st Quarter FY07
- Minor modifications were made to the web interface this quarter, and development of user instructions continued. Although improvements to the interface and instructions will be an ongoing process for some time into the future, a "final" version will be solidified during Q2 FY07.
- NSSL continues to provide FFMP dataset technical support to numerous WFOs.

2nd Quarter FY07
- To simplify the National Basin Repository data download and assimilation procedure as requested by FFMP developers, the ArcView Basin Customization Extension was updated to include new geoprocessing tools. The entire data download and assimilation procedure, including use of the newly included tools, will be tested by Bob Davis (Pittsburgh WFO) during the next quarter. Suggestions resulting from the testing will be incorporated into the final user instructions.
- NSSL continued to provide FFMP dataset technical support.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None
- Data Delivery Extension configuration issues are still being worked out.

4th Quarter FY05
- Delays in completing the seamless dataset were encountered due to the need for re-delineation in some areas. The re-delineation is critical for ensuring a high-quality dataset.

1st Quarter FY06
- Data Delivery Extension configuration issues specific to the seamless dataset are being resolved. We will enlist help from ESRI to ensure the data download capability is available as soon as possible in FY06 Q2.

2nd Quarter FY06
- The decision was made to halt work with the Linux versions of ArcIMS and DDE and install the Windows versions instead.

3rd Quarter FY06 - None

4th Quarter FY06 - None

1st Quarter FY07- None

2nd Quarter FY07- None

Dual Polarization Radar Precipitation Estimates

Theme: Flash Flood Services

Management Lead: David Kitzmiller

Objective: Improve flash flood detection through application of dual-polarization radar estimation algorithms

Milestones (AHPS)

Task	Due Date	Status
Evaluate 2004 rainfall estimates from NSSL	Mar 31 2005	Complete
Obtain cool-season 2004-2005 precipitation estimates	Jun 30, 2005	Complete
Obtain and evaluate 2005 warm season estimates	Sep 30, 2005	Complete
Evaluate NSSL "QPE1" or "Combined" algorithm rainfall products scheduled for ORPG Build 10 (ROC and NPI support)	March 1, 2007	Superseded by "QPE2"
Evaluate NSSL "QPE2" or algorithm rainfall products scheduled for later implementation (ROC and NPI support)	May 31, 2007	Completed

Accomplishments/Actions

1st Quarter FY05
- Finalized MOU with National Severe Storms Laboratory, for delivery of reports and dual-polarization precipitation estimates and edited reflectivity data.
- Obtained some retrospective data from 2003-2004 from NSSL.

2nd Quarter FY05
- Completed initial validation of 2004 warm-season NSSL dual-polarization rainfall estimates, and found that accuracy of these was superior to coincident operational estimates from nearby WSR-88D unit.
- Archived some winter precipitation estimates from NSSL experimental radar.
- Obtained some rainfall estimates from 2003-2004 period that have been reprocessed by NSSL to correct radar calibration errors.

3rd Quarter FY05
- Initiated monthly teleconferences with NSSL and Radar Operations Center (ROC) personnel on dual-pol verification studies
- Completed collection of 124 hours' dual-pol precipitation estimates during the cool-season (January – March) 2005
- Continuing verification of dual-pol estimates and cross-comparison with coincident WSR-88D (KTLX, Oklahoma City) estimates

4th Quarter FY05
- Later evaluations of 2005 warm season data suggested calibration problems with KOUN dual-polarization unit. NSSL provided reprocessed estimates from May-June 2004 and February, May, and June 2005, incorporating manual corrections to the calibration. Further evaluation still indicates that the current radar and precipitation algorithm are only competitive with operational WSR-88D, not necessarily superior.

1st Quarter FY06
- NSSL staff reported that all earlier sample precipitation estimates were compromised by being from an obsolete code package, and that certain basic algorithm modifications were needed to clear up instabilities in some finite-difference calculations for the specific differential phase

variable.

- Further evaluation of NSSL data is on hold until early CY 2006, when NSSL hopes to have problems corrected and to proceed with re-calculation of historic data cases
- We are proceeding with independent analysis of NCAR dual-polarization data. A sample has been decoded and horizontal Z-R rainfall estimates have been derived from that portion of the data sample. Later, the NSSL dual-polarization algorithm will be applied to the NCAR data and evaluated for applicability in a subtropical environment (Melbourne FL).
- We will attempt to proceed with an evaluation of the NSSL Hydrometeor Classification Algorithm, to determine its ability to discriminate between biological targets and precipitation.

2nd Quarter FY06

- Received outline of plan for a partial redesign of the dual-pol precipitation algorithm from NSSL
- Confirmed that NSSL Hydrometeor Classification Algorithm (HCA) is superior to current operational Radar Echo Classifier (REC) in terms of identifying biological targets (birds, insects) that often cause anomalous light precipitation totals in radar products
- Confirmed that the differential reflectivity rainfall algorithm (Z-Zdr) functions properly and reliably when applied to NCAR S-pol data from Melbourne, Florida area

3rd Quarter FY06

- Received new sample of dual-pol rainfall estimates from NSSL in May. Analysis indicates work is needed to reduce noise in precipitation fields that is probably due to noise in specific differential phase moment; NSSL is actively working on the issue. Following post-processing to reduce noise, the estimates are at least comparable in quality to those from the operational KTLX WSR-88D unit, which has routine maintenance and more stable operating characteristics
- Received (in May) a new set of NCAR S-pol base moments for testing of the NSSL algorithm in the Florida environment. Initial analysis indicates these base data have a specific differential phase moment tha is less noisy than the previous sample. We have an initial set of 1-h precip estimates from this data and are analyzing them.

4th Quarter FY06

- Limited progress this quarter. A new contract employee (Brewer) was brought into the project and he got briefings from Kiran Shrestha and Dennis Miller on the S-pol project. We initiated tests on the NSSL sample precip products to determine if they benefit from standard mean-field bias correction with coincident rain gauge data; initial results indicate they do benefit, and thus should be treated in the same manner as conventional radar in multisensor algorithms such as MPE.

1st Quarter FY07 (HSMB)

- New employee (Wu) was brought into the project.
- For project to evaluate NSSL algorithms when applied to NCAR S-pol data: determined that discrepancies in rainfall coverage between WSR-88D and S-pol unit over Florida were likely due to S-pol calibration variations. Analysis is continuing
- Continued tests on mean-field bias correction as applied to KOUN dual-pol QPE
- Obtained new test cases for warm and cool-season precipitation in KOUN umbrella – will expand inititial analysis and comparison with rain gauges and coincident WSR-88D data

1st Quarter FY07 (HSEB)

- Writing algorithm requirements and carrying out algorithm design in consultation with the Radar Operations Center and NSSL

2nd Quarter FY07

- Received data sample with new QPEv2 output in early March. This proved to be a clear improvement over earlier QPE1.
- Evaluated QPEv2 1-hour estimates in terms of correlation and RMS error relative to rain gauge reports
- Recommended implementation of QPEv2 in place of QPE1 to NEXRAD Technical Advisory Committee

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05
- Discovered and partially corrected problems with real-time access to NSSL dual-pol precipitation products.

4th Quarter FY05
- While initial results reported in 2nd quarter were promising, later comparisons between KOUN dual-polarization estimates and operational WSR-88D estimates were not. NSSL requested time to reprocess dual-pol data from later in 2004 and 2005, due to apparent problems with radar miscalibration. This has delayed our evaluation of the 2004-2005 cold season data.

1st Quarter FY06
- Must wait on NSSL staff solving a set of technical problems with the precipitation algorithm, and getting us a new sample of data.

2nd Quarter FY06
- Still waiting on NSSL staff to provide new precipitation estimates. Delivery of output from new algorithm applied to older data promised in April

3rd Quarter FY06
- Departure of Dennis Miller on PPI detail has slowed progress

4th Quarter FY06
- Departure of Kiran Shrestha in late September has slowed progress, though a new contract employee (Daniel Brewer) was brought into the project

1st Quarter FY07 - None

2nd Quarter FY07
- Delays in delivery of QPEv2 fields in netCDF format, delaying further analysis

ABRFC P3 Integrated with MPE

Theme: Flash Flood Services

Management Lead: Jon Roe

Objective: Integrate existing ABRFC P3 and OHD Multi-Sensor Precipitation Estimator (MPE) application functionality into a single set of operational applications. This includes alternate methods for generating multi-sensor precipitation, additional interactive quality control methods, including a more powerful polygon edit feature.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q1	Complete
Pass HOSIP Gate 1.	Q2	Complete
Inventory existing P3 components.	Q2	Complete
Complete document describing existing functionality.	Q2	Complete
Conduct Validation and write HOSIP Stage 2 documents.	Q4	Complete
Complete requirements on enhanced polygon feature.	Q3	Complete
Pass HOSIP Gate 2.	Q4	Complete
Conduct Research & Analysis and write HOSIP Stage 3 documents.	Q1, FY06	Complete
Pass HOSIP Gate 3.	Q1, FY06	Complete
Conduct operational development. Modify design of MPE Fieldgen application to handle new grids. Convert MPE Fieldgen from FORTRAN to C. Complete the integration of P3 functionality into MPE.	Q1, FY06	Complete
Complete HOSIP Stage 4 documents.	Q3, FY06	Complete (Date moved to Q3, FY06)
Pass HOSIP Gate 4.	Q3, FY06	Complete. Passed Stage 4 05/25/2006
Deliver P3-enhanced MPE to AWIPS OB7.	Q3, FY06	Completed

Accomplishments/Actions

1st Quarter FY05

- We obtained assorted information from ABRFC to document existing P3 functionality.
- We nearly completed documentation that is an inventory of P3 operations.
- We installed P3 software at NWS HQ/OHD and established a data flow for it.
- We completed documentation describing the design of a new polygon feature for MPE. This will be shared with ABRFC for discussion.
- We completed the HOSIP Stage 1 NID and passed HOSIP Gate 1.

2nd Quarter FY05

- We have modified the runtime environment of the P3 applications so they operate in the standard AWIPS environment used by the OHD national applications.
- We have established the "create_triangles" application in our baseline; this application will remain as-is as part of the final project deliverables.

- We have fixed a few bugs discovered during our operation of the P3 application.
- We have made significant progress on the port of the MPE_FieldGen program from the FORTRAN language to the C language. The use of the C language will greatly facilitate the insertion of the new grid generation methods used by P3 (i.e. average radar mosaic, maximum radar mosaic, local triangulated bias multi-sensor mosaic).

3rd Quarter FY05

- We have completed the MPE Fieldgen modifications necessary to generate the P3 Local Bias Mosaic. This also includes the generation of two new radar mosaics. These radar mosaics differ in how radar data is chosen for grid bins covered by multiple radar sites. The average radar mosaic takes the average radar value for each grid bin covered by more than one radar. The max radar mosaic takes the maximum radar value for each grid bin covered by more than one radar. These P3 fields are being tested and debugged.
- The polygon management feature design document has been completed and approved by ABRFC. The implementation of these enhancements in Hydroview/MPE is nearly complete.
- The implementation of a split-screen viewing mode in Hydroview/MPE is underway.
- MPE Fieldgen has been completely converted from FORTRAN to C. It is now being tested to ensure that it produces the same output as the FORTRAN version.
- Modifications are being made to MPE Fieldgen to improve its performance. This is being done by caching data which is static in nature.

4th Quarter FY05

- Completed modifications to MPE Fieldgen to make it easier to add new products, including the P3 Local Bias Mosaic.
- Ported MPE Fieldgen from FORTRAN 77 to C. This was done because C offers user-defined data types and stricter compile-time code checking. It also provides a better environment for structured programming and the use of software debugging and metric tools. This opens the door for software portability and better maintenance.
- Discovered and implemented optimizations for MPE Fieldgen code which will enhance its performance.
- Modified Hydroview/MPE to display the P3 Local Bias Radar Mosaic, the Average Radar Mosaic, the Maximum Radar Mosaic, and the P3 Gage Triangles overlay.
- Modified Hydroview/MPE to have a split screen mode to allow the user to compare base and derived fields when editing gage and bias values and drawing edit polygons.
- Improved the Hydroview/MPE polygon edit tools. Edit polygons are now stored in disk files and can be easily retrieved. The user has the ability to selectively delete polygons and toggle on/off polygons. The user has the ability to create polygons for a specific hour and polygons which persist over many hours.
- Changed MPE Fieldgen so that polygon edits to base fields (e.g. radar mosaic, field bias corrected mosaic) are applied before the field is used in the computation of derived fields (e.g. multisensor mosaic).

1st Quarter FY06

- In October, delivered a prototype of MPE with the P3 local bias field to ABRFC.
- Visited ABRFC to discuss HAS forecasters' concerns with the prototype MPE program, to demonstrate the features of the prototype, and to discuss plans for future MPE enhancements. A small list of action items was created.
- Corrected and enhanced the MPE application as result of list of action items.

2nd Quarter FY06

- Little activity occurred during this quarter. OHD is awaiting the install of AWIPS OB6 at ABRFC in order to establish a workstation environment with the PostGres database. Shortly thereafter, OHD plans to install the OB7.1 version which has the P3 functionality integrated into the MPE_Editor application. We expect the OB6 install to be completed sometime in May or June 2006. OHD and ABRFC have held discussions about modifications made to the local P3 application; they involve a method for using the PRISM estimate data to fill in a polygon with values adjusted/weighted by the PRISM values for the areas inside the polygon area. The

concept of joint development activities between OHD and ABRFC was also discussed. The HOSIP documents will be submitted in the third quarter, as the software was delivered to AWIPS for OB7.1 in later February 2006.

3rd Quarter FY06
- Similar to FY06 Q2 status, we are awaiting the install of the software on the operational ABRFC system for their evaluation. OB6 and its PostgreSQL database server have been installed, allowing the evaluation to proceed. HSEB has assembled an OB6 compatible version with OB7.1 features that will be used for the evaluation. This version was delivered in Q3 and is awaiting ABRFC installation and subsequent evaluation.

4th Quarter FY06
- ABRFC operational evaluation being conducted starting early October-November. This period will conclude with a documented report from ABRFC on the operational usefulness of MPE/P3 functions

1st Quarter FY07
- OHD received an evaluation from ABRFC of the MPE/P3 capabilities. OHD and ABRFC cataloged ABRFC requests for changes and discussed them in detail, resulting in a list of items to be worked on. These will be implemented in the OB82/83 deliverables, with beta test versions provided to ABRFC. This project is now considered closed and there will be no further reports.

Problems Encountered/Issues

1st Quarter FY05
- We need to coordinate the detailed requirements of the P3 application with regard to existing MPE functionality, via communications with ABRFC.
- We need to distribute the polygon management feature design document for comments. Design work on the integration can then proceed, with actual development starting shortly thereafter.

2nd Quarter FY05 – None

3rd Quarter FY05
- The testing of the C version of MPE Fieldgen has been slower than expected. We have found it necessary to perform unit testing (testing on a routine by routine basis) especially for computationally intensive MPE products such as those which incorporate the mean field and local biases.

4th Quarter FY05
- Encountered some gage QC problems. Automated checks which are supposed to prevent bad gage values from getting into the mean field bias calculations don't always work. A better way of applying automated QC checks to gage data, especially PC data, are needed. Some of these problems are the result of replacing Siipp with GagePP.

1st Quarter FY06
- The visit to ABRFC in October resulted in a small list of action items that still needed to be completed for the P3 into MPE project before ABRFC would try using it operationally. Work was performed on these items. The highest priority action item was also the most difficult one to fix. This action item called for the P3 into MPE application to allow gages outside of the office's MPE forecast area to influence the P3 local bias analysis. ABRFC claimed that their version of P3 offered this functionality. However, it turns out that their version of P3 does not behave this way. Several weeks of development and debugging time were spent to reach this conclusion. ABRFC is willing to start using MPE operationally when OB6 is installed at their office in February 2006.

2nd Quarter FY06

- See status information

3rd Quarter FY06
- Awaiting ABRFC checkout. ABRFC has added a new feature in P3 that OHD will work to implement into operations. This feature was discussed in the Q2 FY06 status.

4th Quarter FY06 - None

1st Quarter FY07 - None

Radar Based Probabilistic QPE (PQPE)

Theme: Flash Flood Services

Management Lead: David Kitzmiller

Objective: Improve flash flood detection through application of radar-based probabilistic quantitative precipitation estimation (PQPE) algorithms

Milestones

Task	Due Date	Status
Develop demonstration version of radar PQPE system	Jun 30, 2005	Complete
Demonstrate real-time prototype version of PQPE system	Sep 30, 2005	Complete
Present verification statistics showing advantages of PQPE over deterministic precipitation estimates	Sep 30, 2005	Complete
Complete HOSIP SON, Conops, operational requirements for radar-based PQPE to support flash-flood monitoring and prediction	April 30, 2006	Further Delay – Q1 FY07
Complete Project Plan for radar-based PQPE	May 31, 2006	Further Delay – Q2 FY06
Design for preparation, dissemination of radar rainfall error distribution parameters for operational use	July 30, 2006	Further Delay Q1 FY07
HOSIP approval of operational design	Sep 30, 2006	Delay to Q2 FY07

Accomplishments/Actions

1st Quarter FY05
- Accepted proposal for final phase of development/demonstration project from University of Iowa contractors.

2nd Quarter FY05
- Initiated validation study of U. Iowa work, and derived demonstration probability products: probability of rainfall exceeding 0.1 and 0.5 inch per hour, and 50th and 75th percentile rainfall amounts derived from radar rainfall estimates.

3rd Quarter FY05
- Received and began evaluation of U. Iowa mid-term report, which contains documentation on the statistical properties of 1-hour WSR-88D rainfall estimate errors
- Major findings: 1-hour radar rainfall estimates have a consistent rainrate-dependent bias component, and random errors in the estimates can be modeled as a Gaussian distribution
- Determined that statistical correction of 1-hour rainfall estimates reduces RMS errors relative to rain gauge reports, particularly for radar estimates in excess of 10 mm h^{-1}

4th Quarter FY05
- Enhanced existing real-time offline version of Multisensor Precipitation Estimator (MPE) to calculate probability that one-hour flash flood guidance amount has been exceeded, based on radar-estimated rainfall. Probabilities are shown under: http://www.nws.noaa.gov/ohd/hrl/hag/ffp_marfc/mxprobo/mxprobo.htm
- Obtained statistics from 2004-2005 warm seasons showing effects of rainrate-dependent bias adjustment in improving RMS error in rainfall estimates.

1st Quarter FY06
- Received U. Iowa final contract report, and obtained internal and external reviews indicating the initial work is complete

- Drafted Concept of Operations and Operational Requirements

2nd Quarter FY06
- OSIP Stage I document approved (1/27/2006)

3rd Quarter FY06
- Collected conterminous U.S. data sample of radar Digital Precipitation Array and collocated 1-h rain gauge reports covering 2004-2006, for error model development
- Presented posted on error model development and applications at May AGU conference, Baltimore
- Work on HOSIP documents continuing

4th Quarter FY06
- Work on formulating an operational version of the Krajewski-Ciach model was started upon arrival of an NCEP/HPC employee on a rotational assignment (Pereira). Work involves examination of 1-h gauge/radar pairs from many WSR-88D sites.
- Results suggest the existing PQPE model is reliable for larger amounts (> 0.75 inch h-1) but it tends to underestimate probabilities of lower amounts – a modified model might be required in which an empirical table is used to estimate probabilities of smaller amounts
- Still expect completion of an operational model for 0-1h amounts by December
- Revised Concept of Operations to emphasize the development aspect of the PQPE project and how the PQPE model information will be stored and updated in AWIPS, rather than end-user applications such as FFMP

1st Quarter FY07
- Developed and presented alternatives for a radar precipitation error model at an OFC seminar in December (Pereira, Kitzmiller, Guan)

2nd Quarter FY07
- No work this quarter

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 – None

1st Quarter FY06
- Scope of work still to be determined, given funding uncertainty

2nd Quarter FY06
- Departure of Richard Fulton, initiator of the original project

3rd Quarter FY06
- Departure of Rich Fulton has affected overall progress. A rotational assignment staffer has been engaged to work on data analysis September-November 2006.

4th Quarter FY06
- HOSIP work limited this quarter, with only drafting work and limited internal review ongoing. Further slippage into FY07 is inevitable.

1st Quarter FY07

- Further work on hold pending new FTE hire in the hydrometeorology group

2nd Quarter FY07

- No work this quarter

Satellite Radar Gage Integrated with MPE

Theme: Flash Flood Services

Management Lead: Jon Roe

Objective: To provide an automated gridded estimate of the precipitation estimates using satellite data objectively integrated with existing radar and rain gauge estimates within the Multi-sensor Precipitation Estimator (MPE). This will provide improved estimates for certain areas where coverage from radar and gage data networks is limited. Satellite estimates have been operationally available within MPE to a limited degree for some time. This new feature will provide a fully integrated estimate from the three data sources.

Milestones

Task	Due Date	Status
Pass HOSIP Gate 2	Q1, FY2006	Complete
Complete Stage 3 documents	Q1, FY2007	Completed
Pass HOSIP Gate3	Q1, 2007	Completed
Complete Stage 4 activities	Q3, FY2007	Not complete
Pass HOSIP Gate 4	Q3, FY007	Not complete
Deliver to AWIPS	Q3, FY2007	Not complete

Accomplishments/Actions

3rd Quarter FY06
- No work completed, other than acceptance of the project into AWIPS OB8 by the AWIPS SREC from OSIP, due to allocation of resources.

4th Quarter FY06
- The Con Ops document was updated and sent for field review on 09/29/2006. Comments were received from NWRFC, and changes incorporated into the document.
- The Project Plan document was updated to include Stage 4 information.
- The NWRFC and WGRFC have been contacted and have show interest in being a beta evaluation site.

1st Quarter FY07
- Passed Gate 3. Discussion of beta testing resulted in WGRFC and CBRFC being chosen as the beta sites.

2nd Quarter FY07
- Completed software development for a working version of the MPE application suite that supports SRG products. Some final database changes are still needed, and will be completed for the final delivery. This version allows the software to be installed at RFCs for test and evaluation. The software has been installed at WGRFC.

Problems Encountered/Issues

3rd Quarter FY06
- This activity is scheduled for AWIPS OB8.2, which expects the software to be handed off in May,

2007. The above schedule is based on this release timing.

4th Quarter FY06

- Chandra Kondraguta, the primary representative of the scientific components of this project, has left OHD in October 2006.

1st Quarter FY07

- The HOSIP scientific algorithm document for this project did not have adequate detail for a programmer to be able to successfully implement. The pseudo-code section was extremely short of detail. The narrative information did provide helpful information. This concern was expressed by Mark Glaudemans at the HOSIP review.

    The developer (Paul Tilles) implementing this algorithm has considerable experience in this functionality. Also, the algorithm is essentially a duplicate of existing multi-sensor processing, using satellite data in place of radar data at key points in the processing. Because of these mitigating factors, the Stage 4 implementation will probably be possible.

2nd Quarter FY07 - None

COE Hydraulic Models for NWSRFS

Theme: Innovations

Management Lead: Pedro Restrepo

Objective: Evaluate Corps of Engineers and other organization models for their suitability for NWS river forecasting operations

Milestones

Task	Due Date	Status
Detailed Plan Preparation	5/31/06	Complete
Requested feedback from the field on Hydraulic Model Capabilities	7/22/06	Complete
Prepared evaluation criteria for testing	7/05/06	Complete
Team members training in the models to be evaluated	1/30/07	
Start evaluating the simplicity/complexity in setting input data	12/30/06	Complete
Design the technical evaluation test	1/30/07	
Proceed to test the models by executing them	3/01/07	

Accomplishments/Actions

2nd Quarter FY06
- Reggina Cabrera received responses to a questionnaire she sent the DOHs regarding the level of hydraulic expertise in their RFCs.
- We held two teleconferences to nominate the replacements for Larry Black, who retired, and Dave Brandon, who moved to WR HSD chief position.
- Reggina is in the process of selecting the evaluation team from field personnel and the detailed evaluation plan. This plan may include visits to OHD by team members.
- We plan to evaluate the COE models, the Delft 1-D 2-D model. The Innovation team also approved the purchase of one license of the Delft 1-D 2-D model, should the tests prove successful.

3rd Quarter FY06
- Evaluation Team was formed and started working on June 1, 2006
- The team already wrote the Evaluation Criteria (EC) for the testing.
- A Matrix of Needs (MON) was created and sent to all the RFCs to get their feedback on the needs at the national level and priorities should be derived from all the responses.
- The data sets are being collected and they will be selected no later than August 7, 2006.
- DHI sent a license with the models MIKE-11 and MIKEFLOOD for testing
- We have planned two training sessions of at most 2 days each for the DHI and Delft models, plus a talk in HEC-RAS

4th Quarter FY06
- The team met in September at Silver Spring and got training in Sobek, MIKE-11 and MIKE-21. The member sent comments about their first impression about these models.
- There will be two sets of data we will be testing, the Red River and the Sacramento River. The Sacramento is being prepared to be sent to the field.
- The SON was written for HOSIP. It is in its final review now.
- The new licenses for DHI arrived.
- We planned the HEC-RAS training and also we planned Danny Fread's training for November,

2007.
1st Quarter FY07

- The training for FLDWAV and steady state HEC-RAS models was finished. The team members are setting the different input data sets and finishing the evaluation of the simplicity/complexity in setting the models.

2nd Quarter FY07
- Hydraulic models are being tested and evaluation in the process of completion. The material for the report has been gathered. We are initiating the process to asses the operational feasibility of the selected model.

Problems Encountered/Issues

2nd Quarter FY06
- Reggina joined OHD on April 2.

3rd Quarter FY06 - None

4th Quarter FY06
- We were waiting on the renewal of the licenses for DELFT.

1st Quarter FY07
- Several issues have come up and the report on the findings is being drafted as we progress through the evaluation. Sanja Perica was selected to guide the team during the last part of the technical evaluation.

2nd Quarter FY07 - None

Prototyping NMQ for FFMP

Theme: Flash Flood Services

Management Lead: Ken Howard and Jian Zhang, NSSL; Mary Mullusky and David Kitzmiller, NWS

Objective: To test a high resolution Cartesian based regional multisensor QPE and QPF as input into FFMP and to facilitate a NCEP implementation of NMQ system for the national creation of QPI products and prototype dissemination to individual RFCs and weather forecast offices. The following project builds upon the FY05 NMQ to FFMP demonstration project and a FAA sponsored project for the implementation of the NMQ 3-D reflectivity mosaic code set within NCEP operational environment. Through an NCEP implementation, the full NMQ product suite can be prototyped and enhanced for potential utilization within RFC operations as well as within WFOs in FFMP.

Milestones FY06

Task FY06	Due Date	Status
Creation of initial 'radar only' Q2 products on a Cartesian grid of 1-kilometer resolution with refreshing rate of five minutes CONUS.	March 15, 2006	Completed
Implementation of Q2 gage correction scheme using NCEP gage data feed.	May 15, 2006	Completed
Creation of and delayed preliminary real time multisensor Q2 products on a Cartesian grid of 1-kilometer resolution with refreshing rate of five minutes CONUS.	June 15, 2006	Completed
Dissemination of Q2 products on a Cartesian grid of 1-kilometer resolution updated every five minutes for CWA (Phoenix) regions for ingest into FFMP.	July 1, 2006	Q2 product creation Completed – Ingest into FFMP set for Q1 Fy07
Development and access to a web based interface for the real time verification of QPE estimates and associated uncertainties CONUS.	July 1, 2006	Completed
Performance evaluation of Q2 products in FFMP	December 1, 2007	Planned

Milestones FY07

Task	Due Date	Status
Data exploration and coordination for the performance evaluation of NMQ/Q2 radar only products in FFMP	December 1, 2007	Q2 product creation completed in fy06 – Ingest into FFMP moved to Q3 Fy07
Initial NMQ Code transfer and implementation for the creation of 3-D reflectivity mosaic products and 2-D severe weather products (HAD, VIL, etc.).	May 1,2007	In progress
Creation of seamless 'radar only' QPE products on a Cartesian grid of 1-kilometer resolution refresh rate of five minutes CONUS at NCEP.	June1, 2007	In progress
Develop operational strategies for inclusion and dissemination of NMQ QPE products to WFO's and RFC's	August 1, 2007	Planned
Configure NMQ QPE as a prototype external data source for RFC and WFOs	September 30, 2007	Planned

Milestones FY08

Task	Due Date	Status
Adapt EMPE to ingest NMQ fields as a external data source	December 1, 2008	Planned
Initial development and testing of a multi sensor 'best of the science' QPI product suite	April 1,2008	Planned
Infusion of Canadian and TDWR radar data as available into NMQ NCEP QPI grids	June 1, 2008	Planned
Customization of NMQ QPI product dissemination per RFC domain and individual FOs	August 1, 2008	Planned
Complete initial assessment of multi sensor 'best of the science' QPI product suite	September 30, 2008	Planned

Accomplishments/Actions

1st Quarter FY06
- Completed assessment and comparison of WDSS-II ingest, QC (NN) and 3D mosaic (merger) with NMQ application.
- Initial coding and testing of 'radar only' Q2 has been completed. CPU load tests for running initial CONUS Q2 product suite have been completed. Hardware configuration and system updates for running initial Q2 products CONUS to be complete by 2/28/06.
- Several case studies have been completed regarding the generation of VPR s and possible 'gap' corrections on 3D mosaic fields. Real time CONUS VPR correction coding is in progress.

2nd Quarter FY06
- The initial suite of NMQ Q2 QPE products is being generated in real time, nationally, with a five-minute update cycle at 1x1 km resolution. The initial Q2 products and national mosaic products are being disseminated using ftp and ldm protocols to collaborators and researchers at NCEP, NESDIS, RFCs, OHD, UCAR, ESL, GLERL, NCAR, Unidata and the FAA.
- A website has been established to provide 'quick looks' at the NMQ and Q2 product suites. The NMQ website forms the basis of NSSLs QPE Verification System (QVS) currently under development. The initial QVS webpage is located at nmq.ou.edu/~qpeverif/Experimental/. The QVS page is experimental and will continue to evolve as products and verifications tools are added.
- Hardware and software is currently being configured for the Arizona Q2 prototype system The Southwest Q2 system will be delivered to the Salt River Project/NWS facility in early June 2006. The system will serve as the basis for generating and testing high resolution Q2 QPEs into FFMP in the southwest encompassing several CWAs. Testing is anticipated to begin 1st QR 07. However, Q2 QPEs in the southwest will be generated beginning July 1 and will be made available for use in the Arizona Flood Warning System for evaluation and verification.
- The North American Scale Remote Sensor Precipitation Estimation OSIP SON was officially posted on 3/29/06.

3rd Quarter FY06

- The Southwest Q2 system has successfully been deployed at the joint SRP/PHX NWS facility. The system integrates Phoenix TDWR data along with 6 WSR-88Ds in the region. High resolution Q2 products are being generated for the state of Arizona. The Southwest Q2 data is ready for inclusion in the FFMP demonstration project, which is set to begin in FY07 Q1. Currently Q2 products for Arizona are being archived and analyzed for several significant precipitation events that occurred during July 2006.
- The NMQ Q2 products continue to be generated in real time nationally with an average latency of less than 110 second from product valid time. The initial Q2 products are continually under refinement and assessment through the NMQ QPE verification system (QVS). Additional QPE products have been add to the QVS such as the NEDSIS hydro-estimator.

- Vertical Profiles of Reflectivity (VPRs) are currently being generated for each WSR-88D with real time VPR plots on the NMQ QVS system. A gap filling technique utilizing the VPRs is currently being evaluated over the eastern 1/3 of the CONUS. Once a gap filling assessment is completed, a VPR correction will be deployed CONUS within the NMQ. Additionally, several QPE related algorithms are being developed utilizing VPRs in determining bright band height and the presence of warm rain microphysics for dynamically adjusting the Z-R relationships.
- 31 radars from Canada are being received and ingested within the NMQ system. The individual Canadian radars are being compared with adjacent WSR-88Ds using the Radar Reflectivity Calibration Tool (RRCT) to determine offsets leading to techniques for correctly combining Canadian radar with the WSR-88Ds in the NMQ 3-D Radar Mosaics and Q2 products.
- A new gauge-biasing scheme has been deployed within NMQ Q2 product suite and has been under real time performance assessment via QVS.
- A NMQ blog has been implemented for notification of NMQ and Q2 updates and system status. The NMQ Blog is viewable at nmq.ou.edu/~qpeverif/blog/

4th Quarter FY06

- The NMQ Q2 system CPU cluster and communications servers were moved to a new National Weather Center computer room.
- The new URL for the NMQ system webpage is www.nmq.nssl.noaa.gov.
- The Stage 4 product suite has been added to the NMQ system QVS verification system. The Stage 4 products can be directly compared with Q2 products as well as HE products as well as with gauge observations.
- The NMQ Blog contains changes and enhancements to the NMQ system including documentation.
- The 31 Canadian radars have been added to the NMQ RRCT tool for evaluation leading to incorporation into the 3D mosaic snag d Q2 products during Fy07.

1st Quarter FY07

- Completed Fortran coding of new radar reflectivity quality control for single radar reflectivity field. The new radar QC was specifically developed for the NCEP implementation for computational efficiency and is based upon a linear heuristic rule set.
- Completed Fortran code set for NMQ radar ingest and polar to Cartesian transformation.
- Completed code set port for 3D single radar Cartesian reflectivity (SRC) product.
- Completed initial port and CPU resource testing of NMQ single radar Cartesian ingest and QC applications on NCEP mainframe.
- Completed Fortran/C++ coding of Q2 radar only QPI applications with ongoing testing currently.
- Completed and implemented additional statistical analysis tools on QPI verification system.
- Several logic changes were implemented in the polar processing SRC components towards improving the accuracy of QPI products currently being generated on the NMQ system. These changes are focused on mitigating the impacts of radar calibration offsets. For detailed info on the changes see the NMQ blog located on the NMQ hompage (www.nmq.nssl.noaa.gov).

2nd Quarter FY07
- Initial code port to NCEP of radar quality control, single radar Cartesian transformation and 3D mosaic has been completed.
- The Q2 BAMS manuscript has undergone final review and submission.
- Scripts for the required formatting and clipping of Q2 QPI fields as input to FFMP have been completed and tested.

Problems Encountered/Issues

1st Quarter FY06
- All previous NMQ hardware and facility issues have been corrected and/or resolved.

- During the process of standardizing code sets utilizing WDSS-II, it was determine that the creation of a single radar high-resolution 3-D reflectivity Cartesian grid (SRC) would improve the overall efficiency, timing and accuracy of Q2 products for infusion into FFMP. A high resolution 3-D SRC will be created in real time for each WSR-88Ds and then mosaic with subsequent product generation. The refresh rate for the SRC grids will initially be 5 minutes with a horizontal resolution of 1x1 km and 31 vertical levels.
- Transition to WDSS-II coding and operating environment for CONUS NMQ radar ingest, and radar quality control on NMQ system is on going and will be completed by March 1, 2006.

2nd Quarter FY06
- The WDSS-II Neural Net radar Quality Control (NNQC) application was found to be deficient in addressing radar QC issues associated with night 'blooms' and other artifacts. Additional cases are being assembled to facilitate further training of the NNQC application. Previously tested NMQ QC logic is being reimplementation on the NMQ system to augment the NNQC towards improving radar quality specially to address bloom occurrences.

3rd Quarter FY06 - None

4th Quarter FY06 - None

1st Quarter FY07
- Initial bench tests of radar ingest and SRC creation on the NCEP system identified potential CPU and memory allocation shortfalls. Additional testing will be conducted to ascertain memory and CPU requirements.

2nd Quarter FY07
- Testing of Q2 QPI fields into FFMP postponed until 3rd quarter due to a delay in the new FFMP.

Flash Flood Monitoring and Prediction (FFMP)

Theme: Flash Flood Services

Management Lead: Tom Filiaggi, Stephan Smith

Objective: To develop a full monitoring capability for high resolution gridded QPEs for FFMP

Milestones

Task	Due Date	Status
1. The Point Data Control GUI delivered in OB5	12//31/2004	Complete
2. Begin initial design work for gridded QPE monitoring	12/31/2004	Complete
3. Basin Layering enhancement for OB6	02/01/2005	Complete
4. Multiple Frames enhancement for OB6	02/01/2005	Complete
5. Basin Trace capability for OB6	03/31/2005	Complete
6. Provide a method to remove unwanted rain gages form FFMP consideration (OB6)	03/31/2005	Complete
7. Continue work on gridded QPE monitoring for OB7	09/31/2005	Complete
8. Prototype use of NMQ grids in FFMP	02/28/2007	Delayed, proposed due date June 30, 2007
9. Prototype use of EMPE grids in FFMP	04/31/2007	Delayed, proposed due date June 30, 2007
10. FFMP Advanced Design code check-in	05/15/2007	Delayed, proposed due date Dec 2007 to meet OB8.3 check-in
11. FFMP Advanced Beta Testing	09/17/2007	Delayed, proposed due date Mar 2008 to meet OB8.3 delivery

Accomplishments/Actions

1st Quarter FY05
- Completed Point Data Control GUI for OB5
- Began initial design work for gridded QPE monitoring

2nd Quarter FY05
- Completed Basin Trace capability for OB6
- Provided a method to remove unwanted rain gages form FFMP consideration for OB6

3rd Quarter FY05
- Continue development of variable gridded precip ingest.

4th Quarter FY05
- Enhanced design concept.
- Communication with NSSL yielded details which allowed for certain initial streamlining.
- First step will be for a known grid type (lat/lon). Further flexibility may be added later.
- Alpha Test deadline is when AWIPS OB7 gets fielded, which is around September, 2006.

1st Quarter FY06

- Established FFMP processor depict key registration. This is a step towards making grid processing more streamlined.

2nd Quarter FY06
- We have combined this task with the other OB8 tasks, as they all require foundational design changes. This is being called "FFMP Advanced Design". This design has been initiated and discussions have taken place. Additional discussions, requirements reviews, and design reviews are planned.
- This task has been inserted into the OSIP process and is expected to be redirected to SREC.

3rd Quarter FY06
- Many Design Approach discussions have been held with folks both in and out of group attending. Only one approach has been discussed so far. Alternative approaches have been requested of the attendees.

4th Quarter FY06
- Continued discussion regarding requirements and design of FFMP Advanced has occurred.
- New target AWIPS build is OB8.2.
- **Coding** initiated in order to flesh out technical design and requirements. Localization, configuration access, and processing has been worked to a degree.

1st Quarter FY07
- Significant progress in coding prototype.
- Design and requirements continue to be fleshed out
- Nearly functional localization (where a bulk of the work exists)

2nd Quarter FY07
- Significant progress in several areas of code and design.
- Milestones met for Requirements and Design Reviews
- Functional localization and near-functional processor.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05
- Gridded precip ingest (OB7): Need to ingest a *variable grid*, as users will be able to define their grid when acquiring their small basins from an NSSL web page.
- There is a limit to the number of attributes that the SFAccessor class can access (AWIPS foundation, not FFMP software). This seems to be arbitrary and will affect the contents of *customized* basin shapefiles - *and potentially* the basins that are retrieved from the NSSL web page. The affect will be an inoperable FFMP

3rd Quarter FY05 - None

4th Quarter FY05
- Data transfer is still unresolved for operational deployment. For alpha testing, there is a temporary method available.

1st Quarter FY06
- Developer tasking and re-evaluation of the FFMP big picture has led to possible issues. Some of the design issues relating to Gridded FFMP are being counted as part of a bigger re-design issue, thus if we continue to work towards the goal of "prototype for OB7", we may be undertaking parallel development, which is a bit of a waste of resources. The next few months will shed light on the true direction of this.

2nd Quarter FY06

- Re-design will take significant effort. The prototype target is Q1FY07, which means basically January, 2007. This is not an unrealistic timeframe, but will require a good amount of work.

3rd Quarter FY06

- Progress has not been as good as expected, due to time spent on other, higher-priority items in AWIPS (ie: OB7.2 PIT). Targeting OB8.2 for this, but there is a possibility that that will not be met. We will have a better view on this as soon as we can solidify the Design Approach and begin assigning software tasks.

4th Quarter FY06

- OSIP process has yet to redirect to SREC and will require FFMP Advanced to go through Gate 3 before redirection. ***May*** or may not yield a schedule slip for the prototype (target Jan/Feb '07) and possible the AWIPS target of OB8.2. This remains to be seen, but hopefully the schedule will not be impacted.

1st Quarter FY07

- Not enough time in the day. Still attempting to have a functional prototype in February, but this will be challenging to complete.
- The OSIP Task still has not passed Gate 3 and thus not re-directed to SREC and likely will not before AHPS prototype deadline.

2nd Quarter FY07

- Not enough hours in the day. As prototype work continued, it was discovered that short-cuts should not be taken simply to get a 'demonstrable' version. It was first assumed that a 'prototype' did not need to be so complete, but the magnitude of what needed to be included in a prototype expanded as time went on.
- AWIPS code check-in of FFMP – Advanced Design is dependent on passing OSIP Gate 3. Passing OSIP Gate 3 is dependent on the successful completion of the prototype. Since the prototype work has slipped to the end of June, we propose pushing the AWIPS operational deployment of FFMP Advanced from OB8.2 to OB8.3. This change will provide us approximately 5 more months to complete the prototype and conduct vigorous testing including Alpha Testing. This timing will also provide improved coordination with the AWIPS OB8.3 delivery of EMPE.

Multisensor Precipitation Estimator Nowcaster (MPN)

Theme: Flash Flood Services

Management Lead: David Kitzmiller

Objective: Increase flash flood warning lead time through short-range prediction of heavy rainfall; HOSIP approval of MPN project and prototype implementation within operational baseline

Milestones

Task	Due Date	Status
Create and maintain offline version of code suitable for integration with Statistical Distributed Model for flash flooding	March 31 2007	Complete
Project through HOSIP/OSIP Gate 3	Jun 30 2007	On track
Training material developed	Sep 30 2007	

Accomplishments/Actions

1st Quarter FY05
- Demonstrated ability of nowcaster system to forecast time series of precipitation rate, such as can be used in advanced distributed hydrologic models.

2nd Quarter FY05
- Developed method to correct forecasted rainrate fields for artificial zero values in rainy areas, which arise due to spatially-varying motion vectors.
- Collecting verification statistics on forecast rainfall and rainrate amounts.

3rd Quarter FY05
- MARFC-area real-time 0-1h rainfall and rainrate forecasts and enhanced Multisensor Precipitation Estimator (MPE) fields are available at: http://www.nws.noaa.gov/ohd/hrl/hag/ffp_marfc/prodesc.htm
- Above web page is password protected
- Products include precipitation analyses, forecasts, and comparisons with real-time flash flood guidance
- Flash flood case studies were conducted to optimize adaptable parameters of forecast algorithm
- Statistics for forecast verification are being collected routinely

4th Quarter FY05
- Prepared conference preprint documenting improvements offered by Nowcaster relative to simple extrapolation and persistence forecasts of rainrate
- Some Nowcaster forecast fields were sent to Hydrology Group (Seann Reed) for input to hydrologic model HL-RMS. Tests indicate the forecasts yield a realistic response in surface runoff in the hydrologic model.

1st Quarter FY06
- Assisted in preparation of conference preprint documenting the utility of MPN forecasts in driving a distributed hydrologic model for small basins. Input of precipitation forecasts yielded consistently better streamflow forecasts than assuming no future precipitation or persistence of the previous hour's rainfall.
- Documentation of the verification characteristics for 0-1 hour rainfall was completed
- Concept of Operations and Operational Requirements were documented

2nd Quarter FY06

- Conditional approval of OSIP Stage 2 documents (SON, Conops)
- Creating AEL and C-code from original Fortran prototype

3rd Quarter FY06
- Work continues on re-coding extrapolation model from original Fortran prototype
- Routine coordination with MDL staff who maintain FFMP, to insure portability of precipitation products from MPN to FFMP

4th Quarter FY06
- Work continues on re-coding extrapolation model, forecast rainfall accumulation model, and real-time verification model from original Fortran prototype to C
- Work initiated to create algorithm enunciation language (AEL) for modules as needed (extrapolation model already had documentation)

1st Quarter FY07
- Draft CONOPS and ORD sent out for field review; positive comments received
- Inhouse version of MPN coded for later use in Statistical Distributed Model for flash flooding testbed
- AEL completed

2nd Quarter FY07
- Transferred codes to Linux machine
- Working to finalize interface with distributed model
- Drafted science algorithm document

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05 - None

4th Quarter FY05 - None

1st Quarter FY06
- Scope of AHPS work still to be determined, given funding uncertainty

2nd Quarter FY06
- Departure of Richard Fulton, original project lead

3rd Quarter FY06
- Departure of Richard Fulton, original project lead, causing some delays.

4th Quarter FY06
- Departure of Richard Fulton, original project lead, causing delays in generating HOSIP documents

1st Quarter FY07 – None

2nd Quarter FY07 - None

Distributed Hydrologic Model with Threshold Frequencies (DHM-TF)

Theme: Flash Flood Services

Management Lead: Michael Smith

Objective: Continue efforts to validate DHM-TF and begin prototype testing to develop specific requirements for operational implementation.

FY05 and FY06 work showed the benefits of DHM-TF relative to current lumped-model based FFG procedures and the potential for improved lead times by ingesting forecast grids from MPN. Continued scientific validation is needed to understanding the benefits and limitations of the approach under different conditions (e.g. smaller, urban basins, and different hydrometeorological regimes with potentially lower quality forcing data).

Milestones

Task	Due Date	Status
1) Revised HOSIP/OSIP documents given anticipated AHPS resources.	Q1	Complete
2) Completed final revisions to Journal of Hydrology article.	Q2	Complete
3) Collect data and set up model for Baltimore study area.	Q2	80% Complete
4) Code improvements to DHM-TF prototype.	Q2	80% Complete
5) Complete initial historical analysis for Baltimore study area.	Q3	On schedule
6) Code features required for near real-time implementation and tighter link between distributed hydrologic model and nowcaster.	Q3	On schedule
7) Present a DHM-TF case study at the distributed hydrologic modeling (DHM) workshop.	Q3	On schedule
8) Compare DHM-TF and variations with gridded FFG using Baltimore and ABRFC data.	Q4	On schedule
9) Further develop and evaluate the gauge-based flash flood verification; draft a conference or journal paper on this topic.	Q4	On schedule

Accomplishments/Actions

1st Quarter FY07
- The HOSIP/OSIP project plans were updated based on anticipated FY06 resources.

2nd Quarter FY07
- Completed publication process with the Journal of Hydrology
- Made progress on code modifications for DHM-TF prototype
- Completed 80% of the work to collect data and set up the model for Baltimore area

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07
- Higher than expected workloads on other projects with earlier deadlines has delayed progress. We will try to get back on schedule in Q3.

Western Region Daily QC Integrated with MPE

Theme: Flash Flood Services

Management Lead: Jon Roe

Objective: Integrate existing Western Region Mountain Mapper Daily QC (DQC) functionality and OHD Multi-Sensor Precipitation Estimator (MPE) application functionality into a single set of operational applications. A Western Region memo dated 11/18/2003 states the need for MPE to emulate Mountain Mapper in these areas:

- Provide a check based on PRISM, elevation, climate and spatial consistency.
- Estimate point precipitation based on PRISM climatology.
- Display thresholds of values like precipitation or elevation.
- Color code sites based on a statistical qualification using surrounding stations (i.e., computation of standard deviation to denote screened, bad, manual, questionable points).
- Allow user to control threshold for which questionable data is flagged.
- Filter for point data, i.e., use raw or processed data.
- Subdivide the RFC area allowing for multiple, simultaneous quality control processes.
- Add site identifier to error log.
- Generate Mean Areal Precipitation based on discontinuous basins.
- Aggregate six- and 24-hour data time steps.
- Provide the same functionality for temperature quality control.
- Provide the same functionality for freezing level quality control.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q1, FY05	Complete
Pass HOSIP Gate 1.	Q1, FY05	Complete
Visit CNRFC to observe operational use of DQC.	Q2, FY05	Complete
Inventory existing DQC components.	Q4, FY05	Complete
Conduct Validation and write HOSIP Stage 2 documents.	Q4, FY05	Complete
Pass HOSIP Gate 2.	Q1,FY06	Complete
Install DQC at NWSHQ/OHD (via on site visit of Craig Peterson from WR).	Q4, FY05	Complete
Conduct Research & Analysis and write HOSIP Stage 3 documents.	Q3,FY06	Complete
Complete reverse engineering analysis of DQC.	Q3,FY06	Complete
Pass HOSIP Gate 3.	Q3,FY06	Complete; passed Gate 3 on 5/31/2006
Conduct Operational Development (for an initial partial implementation of DQC into MPE) and write HOSIP Stage 4 documents for that implementation. Design the first partial implementation and develop it.	Q1, FY07	Ongoing (moved from Q3, FY06)
Pass HOSIP Gate 4.	Q1, FY07	Upcoming (Moved from Q3, FY06)

Accomplishments/Actions

1st Quarter FY05
- Work did not begin until December 2004. OHD is coordinating with Kevin Werner of Western Region Headquarters. First, there is a need to better understand the existing Mountain Mapper applications and data sets in order to understand the detailed requirements. Documentation, field consultation, and the installation of Mountain Mapper at NWS Headquarters will provide the information needed to identify requirements and complete the design. As much as possible, existing code will be re-used in the integrated operations.
- We completed the HOSIP Stage 1 NID and passed HOSIP Gate 1.

2nd Quarter FY05
- Minimal progress was made in the 2nd quarter. Some general design discussions were communicated between WR personnel and OHD. A visit to CNRFC by OHD staff was conducted, where we discussed and viewed demonstrations of DQC. Significant progress was made on porting the MPE FieldGeneration program from FORTRAN to C, which will help with the integration of the DQC field generation (i.e. gage-only objective analysis) methods with MPE. We have discussed the installation of DQC at OHD by CNRFC staff; it was decided to have CNRFC do this remotely, rather than via a visit from CNRFC.

- The delay is caused by the sequencing of efforts involving national QPE software; OHD is focused on completing most of the ABRFC P3 functional integration with MPE before doing serious design work on the DQC integration. We recently hired an additional contractor who is tasked with working solely on the P3-DQC-MPE applications.

3rd Quarter FY05
- Minimal progress was achieved this quarter. CNRFC was assigned a user ID and password for the purposes of installing the DQC application at OHD. Initial work on installing DQC was begun. OHD staff continued general design discussions. An outline of the DQC processing was prepared by CNRFC and sent to OHD.

- P3 integration into MPE was wrapping up during Q3 which will allow more work on DQC to move forward in Q4.

4th Quarter FY05
- Completed draft of the CONOPS and Project Plan for Stage 3.
- Craig Peterson visited OHD in July and installed the Daily QC software along with a canned data case.
- Daily QC code was moved to the WHFS OB7 development environment. This allowed the code to be compiled using the gcc 3.4.3 compiler and an executable to be created for testing.
- Replaced all directory references in code with .Apps_defaults tokens.
- Completed the review the functionality of Daily QC. Began compilation of specific requirements related to the integration of Daily QC functionality into the HydroView/MPE GUI.

1st Quarter FY06
- Conducted HOSIP Gate 2 Meeting. Revised CONOPS based on comments from meeting. Expect to convene a second Gate 2 Meeting and pass Gate.
- Conducted numerous internal design meetings and coordinated design issues with Craig Peterson of CBRFC
- Completed design of new MPE GUI with DailyQC options incorporated and HydroView options removed.
- Completed User Interface Document.
- Redesigned directory structure for incorporating DailyQC's 6 hour and 24 precipiation data, temperature data and freezing level data.
- Began coding to incorporate DailyQC functionality into MPE GUI.
- Continued discussions with Craig Peterson via email.

2nd Quarter FY06

- Significant software development activity was completed during this quarter. The OB7.1 OHD software was delivered in February 2006. It included the Hydroview and MPE_editor applications as separate applications; these two applications were previously integrated in one application. Numerous design meetings were conducted during this quarter, with major software development completed for the MPE application suite to be delivered in June 2006 for AWIPS OB7.2. The data setup, pre-processor, and other utility applications and data sets were prepared for formal implementation for OB7.2. The project passed into Gate 3 in February 2006. The HOSIP documents Gate 3 were written, but after a delayed review by the AWIPS SEC staff, the documents need to be updated to discuss certain performance attributes.

3rd Quarter FY06

- Major software development continued during this quarter. This culminated in the DailyQC functions delivered as part of the AWIPS OB7.2 delivery of June 6, 2006. This software was then tested on the AWIPS Pre-Integration Test platform. A few issues were identified and corrected. The software was delivered to CBRFC later in June, with installation performed in July. CBRFC will then evaluate the software operationally. Plans were made for a visit to CBRFC in August by two OHD/HSEB staff members to demonstrate and discuss the OB7.2 implementation.

4th Quarter FY06

- Visited CNRFC. Evaluation was reasonable successful, but additional items (some of which are enhancements) were identified. These changes were identified and are scheduled for OB8.x. Began work on installing software at NWRFC.

1st Quarter FY07

- Installed the software at NWRFC. Spent considerable time dealing with specific configuration issues related to the install. Discussed many issues with NWRFC about the different expectations they have of DailyQC as they have historically been using a different version than CBRFC used. Began defining requirements for the next pass of DailyQC feature for delivery in OB8.2. We plan to continue to work directly with the WR RFCs (CBRFC and NWRFC initially) to deliver beta versions to them for evaluation.

2nd Quarter FY07

- A spreadsheet of requested changes and additions was prepared by HSEB based on feedback from WR RFCs. This was shared with NWRFC and a set of prioritized requirements was baselined. These were then assigned to AWIPS OB8.2 or OB8.3, or designated for future consideration. In April 2007, this information was shared and discussed in a conference call for which the AWIPS and national representatives were invited. WR HQ and NWRFC participated in the call. Based on the agreement from this discussion, work is continuing on the OB8.2 version of MPE/DQC.

Problems Encountered/Issues

1st Quarter FY05

- In order to effectively implement the integration of Mountain Mapper and MPE, detailed requirements must be identified, and the design must be formulated to address these requirements.

2nd Quarter FY05

- Significant design work must be completed to address the integration issues, and to account for the enhanced time resolution being proposed for the DQC functions. Currently DQC operates at a minimum of 6-hour durations. For this project, we will be supporting 1-hour durations.

3rd Quarter FY05

- Work on this project was very slow this period due to two main reasons.

- First, key resources within OHD/HL needed to perform the DQC analysis and subsequent HydroView/MPE design were unexpectedly tied up most of the last several months with high priority AWIPS-directed activities including getting hydro VTEC ready for OB6 and performing the large conversion of all hydro software from using Informix to using PostgreSQL. The extent of the AWIPS activities were not only larger (in effort and on the calendar) than previously expected but the series of AWIPS releases between OB4 and OB6 were highly changeable in content from week to week.

- Second, the labor effort expected to analyze the existing DQC functionality and to incorporate its design into HydroView/MPE was underestimated at the beginning of FY05.

- The stretch goal is still to try to get this work into AWIPS OB7.

4th Quarter FY05
- AWIPS OB6 activities related to the PostgreSQL upgrade continued to tie up personnel needed for this project.
- Work to update the Post Analysis application for OB6 diverted resources from this project.
- The goal remains getting Daily QC into OB7.

1st Quarter FY06
- Planning for staged AWIPS deployments in OB7.1 and OB7.2 required special considerations.

2nd Quarter FY06 – n/a

3rd Quarter FY06
- The CBRFC evaluation is a critical period for the DailyQC MPE implementation. Feedback from this evaluation will be integrated into updates of the MPE software suite.

4th Quarter FY06
- Feedback provided from CBRFC. These changes need to scheduled and worked for incorporation into OB8.x.
- Because this is in Stage 4, but has been delivered for OB7.2, we need to update the HOSIP requirements to account for which were considered for OB7.2 and which are scheduled for OB8.x. The build for which a requirement is scheduled is not tracked in the HOSIP requirements table.

1st Quarter FY07
- Still need to update requirements to account for multiple releases of the software, starting with OB7.2 and continuing through OB8.2 and OB8.3 The WR RFCs will be coordinating their individual needs into a prioritized, consensus set of requirements from which OHD development can proceed.

2nd Quarter FY07 - None

Flash Flood Potential Index

Theme: Flash Flood Services

Management Lead: Greg Smith (Colorado Basin RFC)

Objectives: FY06 – FY07:
- Deliver FFPI output to several NWS offices for evaluation / feedback
- Incorporate a dynamic soil moisture component into FFPI
- Evaluate best platform for FFPI should utilize (based on feedback)

FY07 - Explore / Expand FFPI use in the generation of FFG
FY08 - Potential for future expansion / improvements for FFPI beyond FY07.

Milestones:

Task	Due Date	Status
Acquire & Prepare finer resolution GIS datasets	4th qtr FY06	Completed
Update and incorporate methodology and application process	4th qtr FY06-FY07	On Schedule
Re-create FFPI on a national scale and document process	4th qtr FY06-FY07	On Schedule
Identify offices willing to evaluate product	3rd qtr FY06	Completed
Deliver-Test static product – obtain / incorporate feedback (ext to FY07)	4th qtr FY06-FY07	On Schedule
Incorporate a dynamic soil moisture component (ext to 1st qtr FY07)	4th qtr FY06-FY07	On Schedule
Acquire FF Event Data / Verify FFPI Output (ongoing – ext to FY07)	4th qtr FY06-FY07	On Schedule
Define a methodology to utilize FFPI in FFG generation (ext to FY07)	4th qtr FY06-FY07	On Schedule
Peer Review of FFPI Methodology / Application	FY06-FY07	On Schedule
Re-define future CONOPS based on testing / evaluation	FY07	On Schedule
Implement re-defined CONOPS & Improvements/Updates	FY08 & beyond	On Schedule

Accomplishments/Actions

1st Quarter FY06
- Obtained MRLC 30 meter resolution land-use dataset for conterminous U.S.
- Obtained national forest density dataset.
- Converted and merged approximately 25-30% of MRLC data required for application
- Visited PHX WFO (CBRFC funded) to implement initial FFPI for testing/feedback.

2nd Quarter FY06
- Continued to merge MRLC datasets required for application
- Acquired national DEM dataset required for application
- Identified several offices willing to test/evaluate product

3rd Quarter FY06
- Identified scale & methodology issues and addressing these.
- Completed FFPI for LAX office (western region test office)
- Set list of alpha test stations for initial FFPI testing
- Continued to manipulate national datasets for use in FFPI procedure

4th Quarter FY06
- Converted all available MRLC datasets for use in FFPI procedure.

- Developed initial implementation plan for Alpha test sites.
- Continue to manipulate remaining datasets for utilization in FFPI process.
- Continued to manipulate national datasets for use in FFPI procedure.

1st Quarter FY07
- Re-sampled datasets to FFPI grid-cell resolution for alpha test site regions.
- Loaded alpha test site geographic boundaries and clipped datasets to match.
- Met with USFS remote sensing center to verify proper application of wildfire burn data.
- Developing a process with USFS for obtaining wildfire burn data for FFPI application.
- Obtained numerous wildfire burn area datasets for FFPI application.
- Continued to manipulate national datasets for use in FFPI procedure.

2nd Quarter FY07
- Completed creating FFPI for RNK test sites (working on delivery methods).
- All Data acquired for conterminous test sites, ABQ/SGF near completion
- Started review of GRASS GIS and GFS as working environments for FFPI
- Developed FFPI-FFG methods for the CNRFC

Problems Encountered/Issues

1st Quarter FY06
- Some slowdown encountered do to lack of available software licenses
- Some slowdowns do to processing power required, storage requirements for finer resolution data sets.
- Timetable subject to RFC operational responsibilities (minimal impact to date)
- Acquiring timely wildfire burn severity data from the forest service is still challenging. WRH has conducted meetings aimed at accelerating this process and I've been involved in those. Unfortunately this process isn't under NOAA's control**.**

2nd Quarter FY06
- RFC workload / operational responsibilities have had a significant impact on 2nd (and 3rd) quarter development. Most of these tasks will slip at least 1 qtr. Still hopeful to accomplish many 4th qtr tasks on time.

3rd Quarter FY06
- RFC workload / operational responsibilities continued to impact development. Less impact is anticipated during the 4th qtr and early FY07. Some tasks and product delivery will slip into the first half of FY07.

4th Quarter FY06
- RFC operational responsibilities occasionally impact development, otherwise no major issues.

1st Quarter FY07
- RFC operational responsibilities occasionally impact development, otherwise no major issues.

2nd Quarter FY07
- RFC operational responsibilities occasionally impact development, otherwise no major issues.

Enhanced Resolution Multi-Sensor Precipitation Estimator (EMPE) Algorithm

Theme: Flash Flood Services

Management Lead: David Kitzmiller

Objective: Delivery of EMPE in AWIPS OB8.3

Milestones

Task	Due Date	Status
Obtain HOSIP/OSIP gate 3 approval	March 31, 2007	Scheduled May 2, 19
Enhanced MPE field test	July-August 2007	On track
OB8.3 coding and unit testing completed	September 30, 2007	

Accomplishments/Actions

1st Quarter FY06
- Updating enhanced MPE code to enable Nowcaster to use radar-gauge bias information in generating forecasts
- Journal article describing MPE and NEXRAD Precipitation Processing System being drafted
- Concept of Operations and Operational Requirements were drafted

2nd Quarter FY06
- Conditional OSIP Gate 2 approval of SON and Conops
- Began creation of AEL and C-code based on real-time prototype
- OS&T seminar presentation on enhanced MPE and MP Nowcaster, including field representatives by Visitview (April 5)

3rd Quarter FY06
- HSMB and HSEB staff now working together on code integration
- Began integration of Digital Hybrid Reflectivity product decoder in OB7.1 baseline
- HSEB and HSMB staff are refining project plan
- Routine coordination with MDL staff to insure portability of reflectivity mosaic products from EMPE into FFMP
- Planned detailed study of EMPE performance over Tar River basin, North Carolina, in collaboration with NSSL and NESDIS

4th Quarter FY06
- Radar reflectivity and precipitation decoding and mosaicking functions were converted to C code and successfully run in AWIPS OB7.1 baseline
- Work initiated to create algorithm enunciation language (AEL) for modules as needed
- CONOPS and Operational Requirements reviewed by OCCWS and HSEB staff
- Options for obtaining Digital Storm-Total Precipitation (DSP) and Digital Hybrid-Scan Reflectivity (DHR) products from nonassociated radars were explored with HSEB and OS&T-SEC. We expect a final resolution on the approach during FY07 Q2.

1st Quarter FY07
- Implementation into OB8.3 is on schedule
- HOSIP gate 3 meeting scheduled for February, OSIP gate 3 for March

2nd Quarter
- Revised Gate 3 science documentation based on HOSIP administrator's comments

- SREC design reviews carried out
- Initial real-time operation of EMPE within AWIPS
- Submitted RC for general dissemination of DHR, DSP products

3rd Quarter
- Demonstrated real-time operation of EMPE prototype within AWIPS, with D2D displays, for several heavy precipitation events. Data from up to 11 radars ingested and processed simultaneously.
- HOSIP/OSIP gate 3 meetings scheduled for May 2, May 19

Problems Encountered/Issues

1st Quarter FY06
- Scope of work still to be determined, given funding modifications

2nd Quarter FY06 - None

3rd Quarter FY06
- Departure of Rich Fulton, original project lead, causing some delays.

4th Quarter FY06
- Some delays in OSIP process since the group leader is still working as project lead as well

1st Quarter FY07 - None

2nd Quarter FY07
- We were advised by HOSIP administrators to beef up the science documentation, just prior to deadlines for gate meetings. This delayed our gate reviews into the 3rd quarter

ABRFC Gridded Flash Flood Guidance

Theme:　　　　Flash Flood Services

Management Lead: Billy Olsen, John Schmidt, ABRFC

Objective:　　　Research, develop, implement, and evaluate the Arkansas-Red Basin River Forecast
Center (ABRFC) methodology for gridded flash flood guidance.

Milestones

Task	Due Date	Status
Experimental FFG becomes operational FFG at ABRFC for 1, 3, and 6-Hour FFG products.	August 2006	Completed
Additional FFG products (2 Hour)	August 2007	No longer required
Presentation of work to-date at professional meetings is expected 2-4 times	Throughout FY07	AMS Conference 01/07 COMET 03/07
Project Completion- Experimental FFG operational on experimental basis at 4-5 WFOs in 3-4 different RFCs.	August 2007	Operational on experimental basis at LMRFC 03/07

Accomplishments/Actions

1st Quarter FY07
- Presented Gridded Flash Flood Guidance project at Oklahoma Water 2006.

2nd Quarter FY07
- Presented Gridded Flash Flood Guidance project at AMS Conference 01/07 in San Antonio.
- Presented Gridded Flash Flood Guidance project at the COMET FF Hydrology and QPE Workshop in 03/07.
- Presented Gridded Flash Flood Guidance project at the ABRFC-Tulsa District Corps Coordination Workshop in 03/07.
- Completed work so that LMRFC has GFFG operational on an experimental basis as of 03/07.
- The Research Distributed Hydrologic Model (RDHM) is up and running at SERFC as of 03/07.
- Completed several local surveys of low-water crossings to finalize a procedure for WFOs to customize / modify their threshR values where bankfull flows are not appropriate.
- Completed v1.0 of a ThreshR value field survey customization gui for RFC and WFO laptops.
- Purchased laptop, external 500Gb drive and survey equipment.
- Paperwork submitted for purchase order for ESRI ArcGis9.2 and Spatial Analyst.
- Field trips scheduled for WFOs SGF, OUN and AMA for April to do low water crossing surveys.

Problems Encountered/Issues

1st Quarter FY07
- No word on funding approval for this project until Feb. 5, 2007. This has delayed the scheduled first quarter tasks of acquiring hardware and software. This presumably will also delay the completion of OHD's task to "develop a distributed model capacity to incorporate variable daily PE and determine hourly values". It was originally scheduled to be completed by March, 2007.

2nd Quarter FY07
- No word on progress OHD's task to "develop a distributed model capacity to incorporate variable daily PE and determine hourly values".

MARFC Gridded Flash Flood Guidance

Theme: Flash Flood Services

Management Lead: Peter Ahnert, Kevin Hlywiak, MARFC

Objective: Improve the precision and accuracy of Flash Flood Guidance (FFG) generated by the Middle Atlantic River Forecast Center (MARFC) through enhancements that can be operationally implemented quickly, and are based on existing NWSRFS systems and infrastructure with only minor modification.

Milestones

Task	Due Date	Status
Complete expansion of prototype gridded FFG system to the WFO BGM HSA (no cost).	12/31/06	Complete
Complete expansion of prototype gridded FFG system to the WFO LWX HSA (no cost).	7/31/07	~45% complete. Changed from 5/1 to 7/31.
Add display of the new gridded flash flood guidance to the MARFC web site (no cost)	7/31/07	Pending. Changed from 6/1 to 7/31.
Complete development of semi-automated baseflow adjustment strategy (no cost)	8/31/07	Started. Changed from 7/1 to 8/31.
Provide datasets of county based and gridded FFG for the Baltimore Regional study area to Seann Reed in OHD (no cost)	9/30/07	Pending. Changed from 8/1 to 9/30.
Enter project into the HOSIP/OSIP process	9/30/07	Pending. Changed from 9/1 to 9/30.
Complete field studies to refine threshold runoff values from geographically representative sample of small gaged streams in the Middle Atlantic River Forecast Center (MARFC) service area ($15 K)	9/30/07	Pending
Document threshold runoff refinement technique (no cost)	9/30/07	Started
Participate in National FFG Consistency Team to assure FFG parameters and grid assignments are properly coordinated with neighboring RFCs (no cost).	9/30/07	Ongoing

Accomplishments/Actions

1st Quarter FY07
- Worked with OHRFC and NERFC to resolve basin boundary problems (gaps) in assigned FFG grids between the RFCs. Updated the grid assignments for several PA counties in WFO CTP's forecast area.
- Completed expansion of prototype gridded FFG to Binghamton's HSA.
- Developed improved procedure for applying Mean Areal Temperature (MAT) values to grids to reduce winter instability due to difficulties with rain/snow determinations.
- Provided detailed write-up addressing FFG questions to WFO LWX.
- Assisted WFO LWX with procedures for AWIPS display of gridded FFG.
- Briefed WFO BGM Service Hydrologist on FFG methodology.

2nd Quarter FY07
- Partial expansion of gridded FFG to 45% of WFO LWX HSA completed.
- Market Research/Statement of Objectives completed to hire part time contractors (RTi) to participate in field studies to refine threshold runoff values.
- Developed strategy to reduce threshold runoff values in urban areas based on population density as a general estimate of impervious area: adapted 1-km gridded census datasets to HRAP grid scale, and assigned density categories corresponding to 10%, 20%, 30%, 40%, and

50% threshold runoff reductions. Implemented in all zones where prototype gridded FFG is operational, including Baltimore County. While this methodology required a somewhat arbitrary interpretation of population density categories as they relate to impervious area, it nevertheless makes urban-based threshold runoff reductions consistent and objective across the MARFC area.

Problems Encountered/Issues

1st Quarter FY07
- OFS station definition limit was reached. This temporarily halted expansion of gridded FFG in WFO BGM HAS. An OFS file configuration solution was identified and the problem was resolved.
- Difficulty identifying the appropriate funding mechanism that will enable MARFC to use 2 students over the summer for threshold runoff field studies and analyses.

2nd Quarter FY07

- Several milestones postponed by 2-3 months due to work on resolving wintertime problems (see below), operational workload, and staffing shortage. Due dates in the table have been adjusted to reflect new targets.
- Addressed known problem of unrealistic gridded snow model states arising from "unstable" MATs computed at the HRAP scale. Proposed solution was to apply the larger zone MAT to each grid, adjusted for elevation, contained within the zone. Despite a mild early winter, the latter weeks of the 2nd quarter provided cases for operational assessment. While this approach reduced the degree of spatial variability, inconsistencies still existed, primarily due to the accumulated effects of mis-typed precipitation when the zone MAT was near the threshold temperature.   It was apparent that a more robust method was necessary to alter the gridded snow model states based on manual modifications to basins made daily by the operational hydrologists. I therefore wrote and implemented a process that associates any manually applied basin level Snow-17 runtime modifications with appropriate grid segments. This appeared to further improve the gridded snow model states, but only in those cases and geographic areas where the operational hydrologist determined that a manual modification was necessary to improve the basin simulation.
- AWIPS OB7.2 version of OFS FCINIT program, for unknown reasons, has an inordinately slower execution time.   While functionally isn't a problem, the process of defining the multitude of gridded FFG segments became more complex, as the execution times need to be timed and coordinated so as not to interfere with operational priorities.

DamBreak Tools

Theme: Flash Flood Services

Management Lead: Geoff Bonnin

Objective: Replace the exiting tools for simplified dam break with a set of computations that would allow the forecasters at the River Forecast Centers and Weather forecast Offices to generate peak discharges and corresponding water levels due to a dam break situation.

Milestones

Task	Due Date	Status
No activity in this project.	Q1	
Form a team to define the procedure for Quality Control of the data and draft a work plan.	Q2	SON submitted and gate 1 approved.
Write HOSIP documentation and initiate the Quality Control of the data based on pre-defined plan and priorities.	Q3	
Continue the QC and define data base. Select the software to replace SMPDBK.	Q4	

Accomplishments/Actions

1st Quarter FY07
- We have been reviewing the SMPDBK and the tools available for dam break as part of the evaluation of hydraulic models. We also are getting feedback about using LMRFC's Rules of Thumb as the interim tool.

2nd Quarter FY07
- The SON was sent to HOSIP and Gate 1 was approved. We are working on the project plan to define the work and start the process. Coordinating with COMET for their training module in basic hydraulic concepts.

Problems Encountered/Issues

1st Quarter FY07
- HSMB, Hydraulics Group does not have enough staff to start the project.

2nd Quarter FY 07
- HSMB, Hydraulics Group does not have enough staff to start the project.

Gridded Temperature Forecasts for OFS

Theme: Flash Flood Services

Management Lead: David Kitzmiller

Objective: Develop science background for input of gridded 3-hourly temperature forecasts to OFS/NWSRFS, supplanting current method of incorporating only maximum/minimum temperature forecasts

Milestones

Task	Due Date	Status
Estimate optimum weights for converting max/min temps to 6-h averages in current OFS method, for CBRFC, CNRFC, AKRFC areas; present results to OHD and RFC staff	Feb 28, 2007	Complete
Test alternative methods of estimating hourly temperature from max/min values (current operational values; Schaake method)	Jun 30, 2007	On track
Complete concept of operations and project plan for centralized production of MOS-based gridded temperature forecasts for RFC use	Sep 30, 2007	

Accomplishments/Actions

1st Quarter FY07
- Initial task was undertaken for benefit of RFC operations - estimate optimum weights for converting max/min temps to 6-h averages in current OFS method, for CBRFC, CNRFC, AKRFC areas
- Results will also be applied in 2nd step, since most climatic temperature information is only on maximum and minimum values, and a daily cycle estimate must be applied to get instantaneous hourly temperatures
- Determined that these RFC areas will generally benefit by using the conversion weights derived for NWRFC, though RFC-specific weights would be best
- Collected information on availability and utility of PRISM max/min temperature grids for western U.S., Alberta, British Columbia

2nd Quarter FY07
- Sent documentation on new max/min to 6-h average temperature coefficients to staff at AKRFC, CBRFC, CNRFC
- Based on positive feedback, HSEB staff implemented new coefficients as ATAN 876, on 3/22

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Quantitative Precipitation Estimate Evaluation for CI-FLOW

Theme: Flash Flood

Management Leads: David Kitzmiller, OHD and Suzanne VanCooten, NSSL/OAR

Objective: Evaluate significant precipitation event(s) over the Tar River basin (North Carolina) to identify an optimum set of techniques as an initial step towards a state-of-the-science NOAA multi-sensor *quantitative precipitation information* (QPI) for NWS operations. The evaluation will include an assessment of OHD, NSSL and NEDSIS QPI algorithm components towards to determining strengths as well as areas requiring collaborative research and development. Evaluations will include comparisons with independent rain gauge data, operational stage 4 products, *and impact tests on hydrologic simulations*.

Milestones

Task	Due Date	Status
Create multisensor gridded precipitation analyses for the cool-season event 10 December 2004 – 15 January 2005	May 4, 2007	Work underway, likely slip to late May
Assess the performance of various QPI components towards the overall performance of gridded precipitation estimates	June 30, 2007	Proposed
Compile and document components from each QPI algorithm that, based on the assessment, would contribute towards an optimum MSQPE solution for NWS operations	August 31, 2007	Proposed
Report on the evaluation and develop collaborative research strategy	September 28, 2007	Proposed

Accomplishments/Actions

1st Quarter FY07
- OHD – created basic radar input to MPE and EMPE for remaining test events
- NSSL – prepared reference data sets for computing various QPI grid fields
- Limited activity due to lack of funding.

2nd Quarter FY07
- NSSL- Assembled data sets of rain gauge observations collected under the radar umbrellas of KAKQ, KRDX, and KMHX for a period encompassing November 1, 2004 to February 28, 2005. NWS HADS provides the rain gauge data within the radar umbrellas but outside the Tar Basin itself.
  15 minute precipitation data from 38 USGS precipitation sites, AWOS locations
  1 Hour precipitation data from USGS, RAWS sites, North Carolina Econet, ASOS and AWOS
  24 Hour reports from NWS COOP observers
- NSSL, OHD, NCDC – Performed QA/QC on data set to document erroneous reports and questionable values
- NSSL - Coordinating FTP site and access criteria for all research partners to access one common rain gauge data set with accompanying documentation on possible erroneous values discovered from QA/QC procedures
- OHD – established necessary raingauge and radar databases for running MPE and EMPE, began test runs with cool season case

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Short- to Long-Term Forecasts

Distributed Model - SAC-SMA Parameters

Theme: Short- to Long-Term Forecasts

Management Lead: Mike Smith

Objective: The objective of FY05 work will be to conduct research on usage of SSURGO data and verify whether the use of the data can improve current SAC-SMA parameter estimation and further our distributed modeling. Download data for various projects. Procedures will be developed to store and process the massive data sets.

Milestones

Task	Due Date	Status
1. Obtain high resolution SSURGO and Land Use Land Cover data for DMIP1 basins	Jan. 31, 2005	completed
2. Derive new a priori SAC-SMA parameters using high resolution data for some research basins	March 31, 2005	Completed
3. Review, understand theory of a priori parameter estimation procedure	April 30, 2005	completed
4. Streamline parameter updating (add newly derived data in current grid data sets)	Sept. 30, 2005	completed
5. Test new parameters against those derived from STATSGO (both for lumped and distributed)	Dec. 31, 2005	Initial tests completed date move from 9/30/05
6. Modify, extend theory of SAC-SMA parameter estimation (e.g. use of CN number explicitly)	Sept. 30, 2005	completed
7. Extend areal coverage of SSURGO-based SAC parameters for more consistent evaluation	Sep. 30, 2006	Derived for DMIP 2 western basins. Derived for 20 states in SR and CBRFC
8. Evaluate performance of SSURGO-based and STATSGO based parameters on soil moisture simulation over DMIP 2 basins where data available.	FY07 Q3	Delayed into FY07 to correspond with DMIP 2 testing.
9. Derive and test a priori parameters by using combination of STATSGO and Curve Number Grids	FY07 Q3	On track

Accomplishments/Actions

1st Quarter FY05
- Task 1: Most of GIS data for DMIP1 basins are downloaded
- Task 2: Began processing of GIS data to generate SSURGO-based SAC-SMA parameters for IAHS conference

2nd Quarter FY05
- Tasks 2 & 3 have been completed. Fine scale parameters have been derived for some basins in Oklahoma.

3rd Quarter FY05
- Ziya Zhang, Seann Reed, and Victor Koren ran 2km x 2km scale distributed modeling tests with new parameters. Results show improvement over STATSGO based parameters.

4th Quarter FY05
- New version of soil-based SAC-SMA parameters was developed that uses a high resolution CN grid in addition to soil texture. Testing of this new procedure will commence.

1st Quarter FY06

- Began to process data for North Fork American River in CNRFC domain
- Developed basic time estimate to process raw data into parameters.
- OFC Dec 14 on comparison of SSURGO and STATSGO parameters for distributed model simulations. Showed improvement in cases. Gary expressed great interest in the value of these fine scale data for soil moisture simulations.

2nd Quarter FY06

- Mike Smith presented paper on SSURGO and STATSGO data for distributed model simulations at the Joint Federal Interagency Modeling Conference in Reno, Nevada, April 2-6.
- Ziya Zhang's statistical analyses of the distributed modeling simulations shows that the gains by using SSURGO data for parameterization are statistically significant.
- Ziya Zhang investigated methods of automating some of the processing of the raw SSURGO data.

3rd Quarter FY06

- Reviewed an available program to derive STATSGO-based SAC parameters and defined needed changes to develop the program that accounted explicitly for CN grids.
- Provide HL-RMS with Muskingum-Cunge routing option to ABRFC for their testing.
- Continued evaluation of the performance of SSURGO-based and STATSGO-based SAC parameters.

4th Quarter FY06

- N/A

1st Quarter FY07

- This project now leverages the work funded via the Hurricane Supplemental. Significant progress made in streamlining the process of SSURGO data downloading and processing into SAC parameters. New processes use "R" language and GRASS GIS. Validation of new procedures versus initial manual procedures shows generally good agreement.

2nd Quarter FY07

- SSURGO based SAC parameters developed for 20 states in Southern Region and CBRFC domain at 1 and 4km resolutions. Initial comparisons (scatter plots and spatial variability) with STATSGO based parameters show reasonable agreement. HOSIP documents updated to agree with current status of work. Hydrologic modeling analysis of the SSURGO parameters to continue. Intermediate products such as soil porosity were also developed.
- Developed HOSIP documents for this work.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

1st Quarter FY06

- Ziya noted that SAC parameters derived from SSURGO data can show discontinuities at county borders.

2nd Quarter FY06 - None

3rd Quarter FY06

- Trying to automate the processing of the SSURGO is challenging due to different formats among counties.

4th Quarter FY06

- Delays due to 1) difficulties in process automation and 2) efforts to launch DMIP 2 western basin experiments. Also, advances in using soil moisture data for model calibration were explored; a new technique for comparing point-to-grid soil moisture estimates was developed in a related study for the economic benefits of water resources. These latter two developments will help the analysis of STATSGO (with variable CN) and SSURGO soil moisture estimates.

1st Quarter FY07

- Identified problem of disk storage of the SSURGO data: much space is required.

2nd Quarter FY07

- FY07 Q1 disk storage problem resolved by processing the SSURGO data state by state.

Distributed Model - Evaluate New Parameter Approaches

Theme: Short- to Long Term Forecasts

Management Lead: Mike Smith

Objective: The objective will be to evaluate a parameter regionalization approach for SAC and Snow-17 using lumped calibrated parameters. Value of soil moisture data for evaluation and calibration of a priori parameters will be also analyzed.

Milestones

Task	Due Date	Status
1. Derive relationships between lumped calibrated SNOW-17 parameters and watershed properties	Mar. 31, 2005	On schedule
1. Generate SNOW-17 parameter grids over Susquehanna River basin	Apr. 30, 2005	On schedule
2. Evaluate and calibrate derived SNOW-17 parameter grids using snow observations and streamflow	Dec. 30, 2005	On schedule
3. Evaluate a priori SAC-SMA parameters over Oklahoma mesonet using runoff and soil moisture data at different spatial scales	Sep. 30, 2005	Completed April 2005
4. Initial evaluation of possibility of using soil moisture data to calibrate a priori SAC-SMA parameters	Sep. 30, 2005	completed
5. Develop a physically-based procedure to derive *a priori* values of the most critical SNOW-17 parameters over CONUS	Mar 30, 2006	Completed for MF-max, MF-min.
6. Evaluate a priori STATSGO-based SAC parameters over selected regions (e.g., Oklahoma) by comparing to available measurement (e.g., soil moisture, runoff, evaporation)	May 31, 2006	completed
7. Perform calibration of SAC parameters, and analyze their relationships to a priori and climatologic indexes	July 31, 2006	Delayed into FY07
8. Test SAC and SNOW-17 derived parameters over uncalibrated areas/basins	FY07 Q1	Snow-17: initial tests of 2 parameters nearly complete.
9. Evaluate soil moisture simulations over DMIP2 basins from lumped and distributed models.	Q3	On track
10. Extend analysis and tests of a climate adjustment to a priori parameters (increase time period and basins)	Q3	On track
11. Compare long-term climatologic variables (precipitation, evapotranspiration) to their averages over shorter test periods, and evaluate effect of their differences on the climate adjustment factors.	Q3	On track
12. Test SAC climate adjusted parameters over uncalibrated areas/basins from lumped and distributed simulation results.	Q3	On track
13. Investigate other sources of Snow-17 a priori parameter ranges: use energy budget model results	Q4	
14. Derive and test first-cut a priori values of Snow-17 parameters SCF and UADJ	Q4	

Accomplishments/Actions

1st Quarter FY05
- Task 1: Similar analysis was performed for Cont-API model
- Task 4: Runoff and soil moisture data for the Oklahoma mesonet region are collected.

2nd Quarter FY05

- Task 1. Basic relationships developed.
- Task 2, 3. Completed. Fekadu Moreda and Zhengtao Cui delivered distributed model and all parameter grids to MARFC. Fekadu presented paper on this work at the conference of the International Association of Hydrologic Science (IAHS) in Brazil in April.
- Task 4. Ziya Zhang has acquired and processed fine scale soils data for the Oklahoma areas. Victor completed this task and presented work at the conference of the International Association of Hydrologic Science (IAHS) in Brazil in April.

3rd Quarter FY05

- Victor and Fekadu tested the distributed model for a multiyear period over the OK. Mesonet domain to evaluate against soil moisture estimates from the NLDAS project run by NCEP.

4th Quarter FY05

- Victor extended the analysis of Oklahoma Mesonet simulation results. Developed climate adjustment factor to modify the existing a-priori parameters. A grid of these adjustment factors was developed for CONUS. Testing with OK Mesonet soil moisture justifies again the physics of the modified SAC-SMA model. Hypothesis is that the climate index can improve a-priori parameter identification and thus simplify the calibration of distributed and other models.

1st Quarter FY06

- Developed CONUS data set of a priori parameters for Snow-17 based on Eric Andersons initial suggestions.

2nd Quarter FY06

- Ongoing work on evaluation and calibration Sacramento parameters over Oklahoma region and 20 selected river basins. Distributed and lumped approaches are used in these tests. Tests of climate adjustments are ongoing.

3rd Quarter FY06

- Published two papers (IAHS Red Book) on evaluation of a priori SAC parameters over the Oklahoma mesonet region.
- Extended analysis of a priori parameter performance over Oklahoma mesonet basins for lumped-based simulations using runoff and soil moisture measurements.
- Soil moisture measurements were incorporated into the automatic calibration process as an additional performance measure. Preliminary results suggest that the use of soil moisture data can improve a parameter estimation procedure and reliability of model parameters. They are also helpful in manual calibration to be sure that 'good results are achieved for scientifically sound reasons'.

4th Quarter FY06

- More soil moisture tests were performed at 2 New Mexico sites. These tests led to development of an approach that allowed rescaling of soil moisture states simulated using HRAP scale a priori parameters into point soil moisture states by using local soil properties (porosity and wilting point). It has potential for simulation/prediction of soil moisture at a local scale. However, wide range tests need to be performed.

1St Quarter FY07

- SAC-HT: Additional soil moisture tests conducted at the request of New Mexico State researchers (for the Economics Study of the NOAA Water Resources program). The developed approach to rescale soil moisture states simulated using HRAP-scale a priori parameters into point soil moisture states by using local soil properties was tested for 48 Oklahoma Mesonet soil measurement sites. These simulations show much higher accuracy at Mesonet sites comparing to just use of HRAP-scale a priori parameters without rescaling. This shows promise for end-users to get site-specific soil moisture information during coarse-scale (i.e., 4km grid) executions of the SAC-HT model. End-users can obtain local soil properties from field-collected soil

samples or perhaps SSURGO data would be useable.
- Snow-17: Developed CONUS estimates of MF-MAX, MF-MIN using Eric Anderson's recommended ranges modified by topographic attributes such as aspect and forest cover. Delivered estimates to CBRFC. Began testing parameters for selected areas in the Juniata River basin (MARFC).

2nd Quarter FY07
- Developed CONUS Sacramento model parameters from STATSGO data and variable NRCS Curve Number (CN). Parameters developed at 1km and 4km scale. Developed parameters for Maryland to support Baltimore Flash Flood Project with DHM-TF. Began initial evaluation of the STATSGO parameters with/without variable CN.
- Obtained calibrated SNOW-17 parameters of several basins from ED Clark (CBRFC). Started comparing these parameters with a priori Snow-17 parameters.
- Updated HOSIP documents to reflect the current status of these tasks.
- Investigators at U. New Mexico report 'promising' results using Victor's soil moisture simulations for an agricultural economics study. Draft journal paper being prepared.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 - None

1st Quarter FY06 – None

2nd Quarter FY06 - None

3rd Quarter FY06 - None

4th Quarter FY06
- Planned work delayed to work on SnowMIP and New Mexico soil moisture simulations to support Water Resources Economics study. However, the use of soil moisture in the auto-calibration process and a technique of relating point-to-grid soil textures from the New Mexico work will lead to better calibrated parameters to use in the analysis of a climatological adjustment.

1st Quarter FY07
- Delays again due to additional tests requested by the New Mexico Economics study.

2nd Quarter FY07 - None

Distributed Hydrologic Model into Operations

Theme: Short- to Long-Term Forecasts

Management Lead: Jon Roe

Objective: Incrementally develop and nationally deliver components of distributed hydrologic modeling software within the evolving CHPS architecture.

Milestones

Task	Due Date	Status
Expose this project to the larger NWS OSI Process in order to eventually make use of existing AWIPS capabilities for grid display and manipulation.	Q1	Complete
Adjust HOSIP Stage 1 documents and submit to OSIP.	Q1	Complete
Pass OSIP Gate 1.	Q2	Complete
Identification of first increment high-priority requirements, including requirements related to model computations, data display and manipulation, and operational considerations.	Q2	Complete
Adjust HOSIP Stage 2 documents and submit to OSIP.	Q2	Complete
Perform due diligence of a selection of existing hydrologic modeling systems used to process, display and manipulate grid-based data.	Q2	Complete
Pass OSIP Gate 2.	Q2	Complete
Pass HOSIP Gate 2	Q3	Complete
Adjust HOSIP Stage 3 documents and submit to OSIP.	Q4	Complete
Pass OSIP Gate 3.	Q1, FY06	Complete
Perform architectural design development for first increment, including database, computational, display, calibration and operational considerations.	Q1, FY06	Complete
Develop first increment prototype architecture.	Q1, FY06	Complete
Evaluate architectural design and make updates to architectural scheme and implementation.	Q1, FY06	Complete
Perform HOSIP Stage 4 development for first increment targeted for AWIPS Release OB7.	Q1 – Q3, FY06	Complete
Pass HOSIP Gate 4 for first increment	Q2, FY07 (was Q3, FY06)	Complete
Present status update to OSIP Gate committee	Q2 FY07	Complete
Prioritize second increment of requirements for next AWIPS release OB8.2	Q2 FY07 (was Q4 FY06)	Complete
Iterate back to HOSIP Gate 3 for second increment of Build 1	Q2 FY07 (was Q1 FY07)	Not Started
Develop architectural design for second increment of Build 1	Q1 – Q3, FY07	Underway
Perform HOSIP Stage 4 development for second increment of Build 1 targeted for AWIPS Release OB8.2.	Q1 – Q3, FY07	Underway
Pass HOSIP Gate 4 for second increment of Build 1.	Q4, FY07 (was Q3, FY07)	Not Started

Present status update to OSIP Gate committee	Q4 FY07	Not Started
Prioritize final increment of requirements for next AWIPS release OB8.3	TBD	
Iterate back to HOSIP Gate 3 for final increment of Build 1	TBD	
Develop architectural design for final increment of Build 1	TBD	
Perform HOSIP Stage 4 development for final increment of Build 1 targeted for AWIPS Release OB8.3.	TBD	
Pass HOSIP Gate 4 for final increment of Build 1.	TBD	
Present status update to OSIP Gate committee	TBD	
Prioritize requirements for DHM Build 2	TBD	
Iterate back to HOSIP Gate 3 for Build 2	TBD	
Perform architectural design for Build 2	TBD	
Perform HOSIP Stage 4 development for Build 2 targeted for AWIPS Release OB8.3.	TBD	
Pass HOSIP Gate 4 for Build 2.	TBD	
Prepare OSIP Gate 4 documents for DHM Build 1 and Build 2	TBD	
Pass OSIP Gate 4 for DHM Build 1 and Build 2	TBD	

Accomplishments/Actions

1st Quarter FY05
- WGRFC, ABRFC, and OHD agreed on a subset of high-priority functional requirements for the first increment of software development.

2nd Quarter FY05
- We have reviewed several existing distributed modeling systems: the USGS/USDA Object Modeling System (OMS), the NASA Land Information System, the Danish Hydraulic Institute MIKE 11 model, and the NOHRSC SNODAS modeling system. We will be working through simple experiments with the OMS and the NOHRSC system to further our understanding and to select one as the platform for our distributed modeling development.
- We have initiated an OSIP project to look at the existing AWIPS grid editing and display tools to determine if we can take advantage of them for our grids. Using existing tools will speed our development considerably.

3rd Quarter FY05
- We collaborated with NOHRSC in the development of a prototype distributed Sacramento model with the goal of better understanding the pluses and minuses of using the NOHRSC framework at the RFCs.
- We worked with SEC and FSL to determine the feasibility and level of effort required to update D2D and/or GFE to meet DHM's grid and spatial data display related requirements.

4th Quarter FY05
- We completed the analysis of a prototype DHM architecture using NOHRSC's GISRS modeling environment. Due to AWIPS constraints and differences in how NOHRSC does modeling and how DHM would be used at RFCs, we have decided to not pursue using GISRS for DHM at the RFCs.
- We started in-house development of DHM for AWIPS OB7.
- We completed, sent for review, and updated the OSIP documents to enter OSIP Gate 3 Based on the review of the documents by OCWWS, ABRFC, WGRFC, OHD, and SEC, all indications are we will get approval to commence OSIP Stage 4 in early October 2005. In fact, the OSIP Gate 3 was passed on 11 October 2005.

1st Quarter FY06

- We presented the proposed DHM architecture to the AWIPS design review committee. The review generated some action items, which have been addressed. We are still on track for delivery of the first increment of DHM at RFCs for AWIPS OB7.
- We worked with RFC representatives and SEC/OST to finalize the requirements for displaying output from the distributed model in D2D. SEC/OST is now making the necessary edits to D2D.

2nd Quarter FY06

- The DHM architecture and DHM features planned for AWIPS OB7.2 were presented to the DOH Science Steering Team (DSST). A follow-up meeting with the DSST is scheduled for mid-May to go over some of their questions and concerns.
- SEC/OST development of D2D features for DHM is back on track after contractual issues affecting the developer were resolved.
- OSIP project 05-001 "Application of the Graphical Forecast Editor in AWIPS at NWS River Forecast Centers (RFCs)", currently in OSIP Stage 3, will recommend a phased implementation of GFE at RFCs, with Phase 1 being the OB8 release of DHM. OSIP Gate 3 for project 05-001 is expected on 5/23.

3rd Quarter FY06

- DHM Build 1 software was delivered on time on June 6, 2006 to the AWIPS contractor for OB7.2. Corresponding D-2D changes, developed by OS&T/SEC, were also delivered on time.
- The OSIP project 05-001 "Application of the Graphical Forecast Editor in AWIPS at NWS River Forecast Centers (RFCs)" failed its IWT pre-Gate 3 Review. A new approach will temporarily merge OSIP project 05-001 with this project (OSIP ID 04-007) to permit 05-001 Phase 1 to pass OSIP Gate 3.
- Funds from OHD/AHPS to GSD for OB8 GFE software development have now been transferred.

4th Quarter FY06

- As of September, OS&T no longer maintains a development or test system supporting an RFC localization, which is required for the end-to-end D-2D DHM capability. During this quarter, OHD created a local AWIPS development and test environment.
- Minor enhancements to the original DHM Build 1 (OB7.2) functionality are underway; these will be targeted for AWIPS OB8.1.
- Identification and re-prioritization of the next set of requirements targeted for Build 2 has begun
- The next phase of the project (DHM Build 2) is expected to "spiral" back around to OSIP Gate 3 during Q1 of FY07.

1st Quarter FY07

- The project leader for DHM in AWIPS OB8 is now Ai Vo
- OB8.1 content was completed and delivered to Raytheon for testing. Due to a compressed AWIPS schedule, OB8.1 content for DHM was limited to infrastructure improvements and bug fixes; no additional DHM requirements were implemented.
- OHD hosted a 2-day evaluation session in November with forecasters from ABRFC and WGRFC. It is now clear that the OB7.2 functionality with D-2D display of grids is too weak to be successful on its own. A joint decision was made to capitalize on ABRFC's XDMS and HSMB's prototype in the OB7.2 timeframe (also for OB8). OHD agreed to prepare a workshop which will provide training for RFCs and explain the plans for getting distributed modeling into operations.
- GSD will prepare and give a demonstration of GFE running in an RFC environment on January 31 2007 for the HIC conference in Kansas City. OHD will begin the DHM Build 2 requirements definition process based on information gathered at the demo.
- HOSIP Gate 4 for OB7.2 work was originally scheduled for January, but has been delayed until February due to other higher priority projects. OS&T's OSIP analyst determined that the DHM project is only required to pass OSIP Gate 4 when all requirements for DHM Builds 1 and 2 have been met. At the present time, complete implementation is expected to occur in AWIPS OB8.3.

2nd Quarter FY07

- HOSIP Gate 4 for the OB7.2 phase of Build 1 was completed in March
- Status update presented to OSIP Gate 4 in March
- An AWIPS Requirements Review for OB8.2 content (second phase of DHM Build 1) was held at the end of February/early March
- Development is now underway for OB8.2. Several conference calls with ABRFC and WGRFC have been conducted to review design aspects for the software. Of particular concern in OB7.2 was system performance; performance has now been significantly improved for OB8.2.
- The workshop for DHM is scheduled for the week of June 4. HSMB is coordinating the effort with OCWWS.

Problems Encountered/Issues

1st Quarter FY05

- Because some of the identified operational functional requirements are closely related to issues being addressed through software development in other parts of the NWS (e.g., developing software to display and manipulate grids), the project was promoted into the NWS's, Operational Service Improvement Process (OSIP) during the first quarter. This required adjustments to already existing HOSIP documentation which was performed in the first quarter and continues into the second quarter.
- Since this AHPS project was lightly funded for FY05, progress will be slower than seen in FY04. OHD is adding some AWIPS funding support to keep the project moving. The weak funding profile could cause milestones above to slip over time.

2nd Quarter FY05

- One of our contractors found a new (and better) job, so we have been delayed in completing our review of the modeling systems. We expect to have found a replacement by the end of April.

3rd Quarter FY05

- A more thorough review of the ARS/USGS object modeling system (OMS) led us to classify it as not mature enough for operational distributed hydrologic modeling. We will reassess it in the future.

4th Quarter FY05

- After determining NOHRSC's modeling environment (GISRS) is not useful for our purposes, we have started DHM development using the remaining alternative, which is to internally develop DHM architecture/software. We plan to use the existing research prototype and focus our efforts for AWIPS OB7 on integrating it into NWSRFS using a Java-based control structure. As documented in the OSIP documents, choosing this approach may result in reducing the number of DHM features implemented in AWIPS OB7.
- A principal OHD representative in formulating the CHPS architecture is helping to lead DHM development. Our approach for integrating DHM into NWSRFS will take advantage of the ideas being considered in the CHPS project.

1st Quarter FY06

- There is the potential for an interruption in the work being done by SEC/OST because of the transition of the AWIPS contract to Raytheon/Keane.

2nd Quarter FY06

- None

3rd Quarter FY06

- None

4th Quarter FY06

- Raytheon's implementation of changes to D-2D for DHM grid display has not gone well due to the maintenance developer's limited understanding of OHD's requirements and the D-2D

subsystem. After much discussion between OHD, Raytheon, and GSD, all parties agreed that one particular major D-2D problem concerning missing cells in a gridded basin will be addressed by Raytheon for OB7.2.

- It remains unclear what documentation is required by OSIP for DHM Build 1, if any. There is no intention to proceed to OSIP Gate 4 until all functionality has been implemented; this will take at least two DHM Builds.

1st Quarter FY07

- AHPS funding for DHM is now limited to efforts targeted towards CHPS not NWSRFS. This means resources have been reduced to one person (Ai Vo) using Base funds, with some part-time assistance from 2 other developers.

2nd Quarter FY07 - None

Deterministic Verification Tools – Phases 1 & 2

Theme: Short- to Long-Term Forecasts

Management Lead: Jon Roe

Objective: Deliver a state-of-the-art deterministic verification system. We will be working on three functions in this project: developing displays, generating automated (or No Mod) forecasts, and creating confidence intervals. All functions will be pushed through the HOSIP process as a single project.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q2, FY05	Complete
Pass HOSIP Gate 1 for Phase 1.	Q2, FY05	Complete
Conduct Validation and write HOSIP Stage 2 documents.	Q4, FY05	Complete
Pass HOSIP Gate 2 for Phase 1.	Q4, FY05	Complete
Conduct Research & Analysis and write HOSIP Stage 3 documents.	Q1, FY06	Complete
Pass HOSIP Gate 3 for Phase 1.	Q1, FY06	Complete
Conduct Operational Development and write HOSIP Stage 4 documents.	Q2, FY06	Complete
Pass HOSIP Gate 4 for Phase 1.	Q2, FY06	Complete
Deliver new functions to AWIPS for Phase 1 (target Release OB7.2).	Q3, FY06	Complete
Identify additional requirements for Phase 2.	Q3, FY06	Complete
Update HOSIP Stage 2 and 3 documents for Phase 2.	Q4, FY06	Complete
Pass HOSIP Gate 3 for Phase 2.	Q1, FY07	Complete
Conduct Operational Development for Phase 2.	Q2, FY07	Underway
Conduct Operational Testing of Phase 2 enhancements under ATAN.	Q3, FY07	Underway
Deliver new functions to AWIPS for Phase 2 (target release OB8.2).	Q3, FY07	Not Started

Accomplishments/Actions

1st Quarter FY05
- We completed project identification, budgeting, and planning.

2nd Quarter FY05
- We completed HOSIP Stage 1. We are working with ABRFC and MARFC to specify the requirements for a "Raw Model Run." Thanks to both of them.

3rd Quarter FY05
- We are working on HOSIP Stage 2. We have expanded the RFCs who are participating in the derivation of requirements for a "Raw Model Run" to include NWRFC and NCRFC in addition to ABRFC and MARFC. Requirements are being derived for verification displays with the help of ABRFC, CBRFC, NERFC, and NWRFC. Basic requirements derivation and HOSIP Gate 2 will be completed in 4th Quarter FY05. Thanks to all RFCs for participating in this project.

4th Quarter FY05
- We have completed HOSIP Stage 2. We have split off the "Raw Model Run" project from the verification displays project and pushed back the requirements phase of the raw model project to

FY06. We have also began investigations into programming choices for displaying verification graphics and have created a few model displays for the GUI we are to produce, which should help in further requirements derivation and software design in HOSIP Stages 3 and 4, which will commence in 1st Quarter FY06.

1st Quarter FY06
- We completed HOSIP Stage 3. We circulated model displays for the GUI to selected RFCs for comment and held an initial design review of the GUIs.

2nd Quarter FY06
- The design was completed.
- The coding, testing and documentation are well underway and are on target for inclusion in the AWIPS OB7.2 release.
- The display of confidence intervals was submitted to the AWIPS SREC to be considered for inclusion in an OB8.x release.

3rd Quarter FY06
- The Phase 1 code was provided to AWIPS on schedule for the OB7.2 release.
- The HOSIP Gate 4 for Phase 1 was waived in consideration of completion of all AWIPS/SREC activities for acceptance into the OB7.2 release.

4th Quarter FY06
- Revised the HOSIP Gate 3 documents for Phase 2 and submitted them to HOSIP in preparation for Gate review.

1st Quarter FY07
- Successfully completed HOSIP Gate 3 for Phase 2 on December 20.

2nd Quarter FY07
- Successfully completed reviews of the User Interface and Software designs on March 13.
- Received approval of ATAN 877 to allow testing of the enhanced software at four RFCs: ABRFC, NCRFC, OHRFC, WGRFC.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05
- From our initial investigation of the requirements, it is very clear that the work estimates for the tasks to complete the deterministic verification system were gross underestimates. They were underestimates in terms of the time to complete the tasks listed in the initial set of requirements and in terms of determining which requirements have to be met. For example, the "Raw Model Run" is proving to be trickier than initially expected and the verification software will need to be updated to evaluate variables other than stage and support sorting by additional fields, like issuance times.
- Another complicating issue is that during Q2 it was determined that the entire RFC Archive Server database and software suite will have to be converted to run with a PostgreSQL RDBMS in place of today's Informix RDBMS because Informix will not run with the latest AWIPS operating system, Linux RHEL 3u4. The newly identified conversion project will require conversion work to be done on the RFC Verification software in addition to this work and must be done for AWIPS OB7. This complication will most likely affect the milestone calendar for this Deterministic Verification project.

3rd Quarter FY05
- From on going investigations of the requirements, it is clear that deriving the requirements for the "Raw Model Run" will take more time than originally thought, as each RFC seems to use different techniques when generating forecasts, causing some confusion over which forecaster

mods are actually allowable in a "Raw Model Run" and which are not. This has forced the completion of the Gate 2 documents to be delayed to the 4th Quarter of FY05.
- The effect of the PostreSQL conversion of the verification software has yet to be determined, since conversion has not yet commenced.

4th Quarter FY05
- We discovered that the requirements derivation for the "Raw Model Run" is too complicated to complete in FY05 and should be treated a separate project from the verification displays portion of this project. The requirements phase for the raw model has been delayed until FY06.
- The PostgreSQL conversion of the verification software is complete and had minimal effect on the completion of this project.

1st Quarter FY06
- We identified some shortcomings with the proposed calculation and presentation of the confidence intervals. The HSMB will conduct further research and analysis of the confidence interval calculations, so this feature will be incorporated when it is mature. The visualization GUI work will continue to meet the OB7 release schedule.

2nd Quarter FY06 - None

3rd Quarter FY06
- We were unable to test or demonstrate the Phase 1 enhancements during the AWIPS OB7.2 Pre-Integration Testing held in Silver Spring, June 19-22, because the NHDA RAX had not been upgraded to the OB7.2 configuration (RHEL 4 and PostgreSQL).

4th Quarter FY06 - None

1st Quarter FY07
- Scheduling the HOSIP Gate 3 meeting took longer than anticipated.

2nd Quarter FY07 - None

Snow Model - Plans for using SNODAS Output

Theme: Short- to Long- Term Forecasts

Management Lead: Michael Smith

Objective: Develop plan and approach to use SNODAS output to generate run-time modifications to Snow-17 in operational setting.

Milestones

Task	Due Date	Status
1. Review existing Snow-17 modifications	May 2006	completed
2. Familiarization with SNODAS processes and products	July 2006	Complete
3. Devise approach	Aug 2006	Draft plan delivered 9/06
4. Acquire data & write draft code	Sept 2006	delayed
5. Test approach.	Nov 2006	delayed

Accomplishments/Actions

1st Quarter FY06
- No work this period

2nd Quarter FY06
- Developed draft outline of tasks and approach (no. 3 above), gave to Eric for comment after his return to Virginia in March.

3rd Quarter FY06
- Eric Anderson began in-depth planning of project; began coordinating with NOHRSC on details of data and SNODAS model outputs. Eric completed the review of run-time mods such as those with AESC.

4th Quarter FY06
- Eric completed draft plan. Sent to OHD for review. Final plan will be submitted in October 2006.

1st Quarter FY07
- AHPS funding of $38K approved for HL portion of this work.

2nd Quarter FY07
- The Snow Science Steering Team needs to approve this project

Problems Encountered/Issues

1st Quarter FY06
- No work started as Eric was finishing Snow-17 coding changes and final documentation. Also, the AHPS funding amounts weren't finalized.

2nd Quarter FY06 - None

3rd Quarter FY06 - None

4th Quarter FY06

- Snow Science Steering Team created to provide overall direction. This project is included in the list of all OHD, NWS. NOHRSC plans for coordination. Data needed for this project is not available will have to be generated via 'Re-analysis' at NOHRSC; may be a large effort. (note: AHPS SLF Theme Team assigned this item a fairly high priority.)

1st Quarter FY07

- The Snow Science Steering Team needs to approve this project.

2nd Quarter FY07

- The Snow Science Steering Team needs to approve this project

Physically-based Modifications to the Sacramento Model

Theme: Short to long term Forecasts

Management Lead: Mike Smith

Objective: The objectives of this work are to investigate further modifications to the Sacramento model. These include: investigate/modify SAC model to run over cascading planar elements; better treatment of vegetation, perhaps from the NCEP LSM model; treatment of old water/new water in runoff process; treatment of re-infiltration of runoff.

Milestones

Task	Due Date	Status
1. Evaluate need for adding vegetation component to Sac Model. This could include: 1) Evaluate NOAA LSM treatment of vegetation in context of DMIP 2 in OK and Western basins. 2) Evaluate benefit of better PE estimates versus adding vegetation component (i.e. collaborate with Martha Anderson of Beltsville, ARS; get NCEP's PE estimates, evaluate NASA Marshal PE).	FY07 Q4	On track
2. Identify basins with clear evidence of channel re-infiltration. Coordinate with Dave Goodrich of ARS for this; set up RDHM runs for analysis 3. Modify RDHM to test approach if necessary.	FY07 Q4	On track
4. Evaluate need for treatment of Mean residence times and old/new water as per seminar by Jeff McDonnell.	FY07 Q4	On track

Accomplishments/Actions

1st Quarter FY07
- Initiated new project for physically-based modifications to the Sacramento Model

2nd Quarter FY07
- Time estimates developed for potential modifications to SAC-SMA. Identified NCEP actual PE values as possible path. Evaluation of Blue River in Oklahoma for channel re-infiltration not conclusive. McDonnell commented during the seminar on 'old water' that this concept is probably most geared towards hillslope runoff processes.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07
- Hydro group is currently managing 38 major tasks…need prioritization and final budget resolution before moving ahead with new projects.

Auto Calibration for Distributed Model

Theme: Short to long term Forecasts

Management Lead: Mike Smith

Objective: The objectives of this work include developing tools and procedures for auto-calibrating the RDHM to generate parameters for the AWIPS DHM delivered in OB7.2. Two phases are identified for this area of research. First, initial work will focus on auto-optimization of the scalar multipliers of all the gridded parameters (SAC, Snow-17, and routing) so that all parameters are adjusted uniformly. This was done manually in DMIP 1 with good success. A prerequisite for this work is the development of sound lumped hourly parameters. Second, future funding will support work to optimize individual gridded parameters for groups of grids. FY07 work dovetails with the DMIP 2 and other projects.

Milestones

Task	Due Date	Status
5. Modify RDHM to be called by a generic 'wrapper'	FY07 Q2	complete
6. Test initial auto calibration with OK DMIP 2 basins.	FY07 Q2	complete
7. Explore performance issues in context of DMIP 2	Q4	On track
8. Evaluate multi-time scale objective function. Evaluate need for time series component analysis to identify dominant time scales	FY07 Q2	On Track
4. Test Rosenbrock and/or Davidon-Fletcher-Powell search algorithms	FY07 Q3	On track
5. Investigate separate procedures for elevation zones for mountainous areas.	Q4	
6. Evaluate 'MACS'-type calibration strategy	Q4	
7.		

Accomplishments/Actions

1st Quarter FY07
- Developed initial HL-RDHM 'wrapper' algorithm to test various minimization approaches.

2nd Quarter FY07
- Simple direct search algorithm added to 'wrapper' to find best parameter scalar multipliers. This was tested for DMIP 2 with good success. Rosenbrock search algorithm is being tested now. Additionally, a promising new search algorithm developed in 2006 called Dynamically Dimensioned Search (DDS) was located and the code obtained for use free of charge. Coding advances in HL-RDHM were provided to HSEB.
- Developed HOSIP documents for this project.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07
- Long HL-RDHM calibration run times noticed. This was solved by adding code from the older HL-RMS to the new version HL-RDHM so that the calibration routines execute a streamlined version of the distributed model.

Test, validate and comparatively verify the EPP2 GFS Subsystem

Theme: Short- and Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: Test the prototype software, validate the science and comparatively verify the performance. The subsystem extends the forecast lead time to 14 days by the use of GFS ensemble mean forecasts of precipitation and temperature.

Milestones

Task	Due Date	Status
Install the EPP2 GFS Subsystem at HL.	Q1	Complete
Complete functionality assessment.	Q2	Complete
Produce testing, validation and comparative verification results.	Q3	
Complete benchmarking.	Q4	

Accomplishments/Actions

1st Quarter FY07
- Installed the EPP2 GFS Subsystem at HL (w/ the help of Rob Hartman).
- Made test runs in real-time forecast and hindcast modes.

2nd Quarter FY07
- Completed functionality testing and assessment.

Problems Encountered/Issues

1st Quarter FY07
- The near-real-time feed of GFS forecast via the Internet off ESRL/PSD server is not very reliable; may have to develop a new feed off NCEP.

2nd Quarter FY07 - None

Support Experiment Operation and Implementation of Short-term Ensemble Applications

Theme: Short- and Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: Support experimental operation of Ensemble Pre-Processor II RFC and GFS Subsystems, Ensemble Hindcaster, Ensemble Verification System and Ensemble Post-Processor at participating RFCs. Support operational implementation of these and other ensemble applications into AWIPS/FEWS through the Experimental Ensemble Forecast System (XEFS) project. Hold the RFC short-term ensemble workshop.

Milestones

Task	Due Date	Status
Release the prototype EVS to MARFC, hold the RFC STE Workshop	Q1	Complete
Complete design and gap analysis of the Experimental Ensemble Forecast System (XEFS)	Q2	Complete
Establish collaborative development of XEFS with the RFCs	Q3	
Establish skeletal baseline XEFS at HL	Q4	
Support experimental operation of prototype applications	As necessary	

Accomplishments/Actions

1st Quarter FY07
- Released Version 1.0 of the Ensemble Verification System (EVS) to MARFC.
- Organized and hosted the RFC short-term ensemble (STE) workshop.

2nd Quarter FY07
- Completed XEFS design and gap analysis.
- Drafted the XEFS design and gap analysis report.

Problems Encountered/Issues

1st Quarter FY07 – None

2nd Quarter FY07 - None

Enhance Data Assimilation Capabilities for Lumped SAC-UH

Theme: Short- and Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: Enhance prototype AB_OPT and VAR to work at 6- or 3-hr timestep. Carry out testing and evaluation. Support experimental operation of prototype VAR at WGRFC.

Milestones

Task	Due Date	Status
Develop work plan, gain familiarity with prototype AB_OPT and VAR.	Q1	Complete
Select test basins, enhance prototype AB_OPT.	Q2	In progress and on schedule
Complete AB_OPT enhancement, enhance prototype VAR.	Q3	
Test the prototypes and produce hindcasting results.	Q4	

Accomplishments/Actions

1st Quarter FY07
- Haksu Lee, a new UCAR scientist, has developed familiarity with and understanding of the prototype AB_OPT and VAR.

2nd Quarter FY07
- Selected 14 test basins in TX and obtained precipitation and streamflow data from WGRFC. Started enhancement of prototype AB_OPT to allow parameter estimation and optimization at multi-hour timesteps.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Evaluate and Improve the Prototype Ensemble Post-processor

Theme: Short- and Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: Evaluate the prototype ensemble post processor and benchmark performance. Assess the potential effects of MODs and regulations. Improve scientific algorithms for improved performance.

Milestones

Task	Due Date	Status
Gain familiarity with the prototype post processor.	Q1	Complete
Develop and implement in the prototype an objective Adjust-Q procedure.	Q2	Complete
Develop and implement in the prototype a time disaggregation technique.	Q3	
Benchmark performance through ensemble hindcasting and verification.	Q4	

Accomplishments/Actions

1st Quarter FY07
- Satish Regonda, the new NRC postdoctoral fellow, has developed familiarity with and understanding of the prototype ensemble post-processor.

2nd Quarter FY07
- Developed an Adjust-Q procedure and implemented in the research version of the prototype Ensemble Post-Processor.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Improve Ensemble Verification

Theme: Short- to Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: 1) Improve ensemble verification capabilities, including the development of diagnosis and prognostic verification measures, confidence intervals, and techniques for real-time application
2) Develop the requirements for archiving capabilities for ensemble forecasting through interactions with the RFCs, including a plan for newly needed archiving capabilities

Milestones

Task	Due Date	Status
Enhance the prototype Ensemble Verification System (EVS), develop documentation and release the prototype	Q1	Complete
Develop diagnosis and prognostic verification measures, confidence intervals, and techniques for real-time application	Q2	In progress
Implement the new capabilities in EVS	Q3	
Develop requirements for archiving capabilities for ensemble forecasting	Q4	

Accomplishments/Actions

1st Quarter FY07
- Developed a Java User Interface for the Ensemble Verification System (EVS) with enhanced Fortran codes (to pair observations and forecasts and compute verification metrics) and R scripts (for graphical display).
- Developed documentation for prototype EVS and training material presented during the RFC Short-Term Ensemble Workshop in November 2006.
- Released Version 1.0 of the prototype EVS to MARFC in November 2006.
- Started to develop new prognostic verification measures.

2nd Quarter FY07
- Developed new measures and graphics for exploring historical forecast performance (diagnostic verification) and for estimating the quality of a live forecast using historical information that is tailored to that forecast (prognostic verification).
- Implemented the experimental methods for diagnostic and prognostic verification in Java (will be integrated within EVS in Q3).
- Produced the first draft of journal manuscript on the new verification measures.

Problems Encountered/Issues

1st Quarter FY07 – None

2nd Quarter FY07
- Development of confidence intervals has been postponed to Q3/4, in order to support a review of existing methods/codes developed by Allan Bradley.

Improve Ensemble Hindcaster

Theme: Short- to Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: 1) Use the Hydrologic Ensemble Hindcaster to produce hydrologic ensemble hindcasts based on different ensemble pre-processor methodologies (including EPP2, GFS subsystem, and newly developed ensemble pre-processors)
2) Develop user's manual and training document for installation and operation of the prototype Hydrologic Ensemble Hindcaster
3) Develop additional uncertainty analysis capabilities (e.g., ensemble post-processing)

Milestones

Task	Due Date	Status
Use the prototype Hydrologic Ensemble Hindcaster to produce streamflow hindcasts from various pre-processor methodologies	Q1	Complete
Develop a user's manual for installation and operation	Q2	In progress
Develop additional hindcasting capabilities, including ensemble post-processing	Q3	
Develop additional uncertainty analysis capabilities	Q4	
Coordinate verification activities	As necessary	In progress

Accomplishments/Actions

1st Quarter FY07
- Produced ensemble forecast verification results for various forcing inputs (including GFS subsystem hindcasts of precipitation and temperature using GFS forecasts) for AB- and CNRFCs.
- Delivered the enhanced Hydrologic Ensemble Hindcaster scripts to CNRFC.
- Developed a scientific algorithm documentation and training material, which was presented during the RFC Short-Term Ensemble Workshop in November 2006.
- Developed a description of all the verification activities and the verification focal point duties for 2007 with an estimation of work up to 2011, in order to develop a National River Forecast Verification System.

2nd Quarter FY07
- Helped putting the OFS FCST NUMCOSAV enhancement request in the DR list; this enhancement is necessary for the Hydrologic Ensemble Hindcaster to produce retrospective initial conditions at the time step consistent with the forcing input fore-/hindcasts.
- Worked on developing datasets required for running the Ensemble Hindcaster with the forcing input ensembles from EPP II and for verifying the streamflow forecasts at MARFC test basins.
- Supported CNRFC for running the Ensemble Hindcaster with the hydrometeorological ensembles produced by the GFS Subsystem; helped correcting an error on date labels for the GFS Subsystem output ensembles.
- Worked on the Ensemble Hindcaster user's guide (to be completed in by April 07).
- Presented the verification of hydrologic forecasts in the NWS with results from the Ensemble Hindcaster at the International Verification Workshop at ECMWF in Reading, UK in January 2007.
- Produced a paper entitled "Experimental hydrometeorological and hydrologic ensemble forecasts and their verification in the U.S. National Weather Service" to be published in the IAHS red books and presented at the IUGG07 conference.
- Worked on the organization of the RFC Verification workshop to be held at CBRFC in mid-

August 2007: developed an agenda, contacted the speakers, developed a description of RFC verification focal points who will attend the workshop, and helped developing a survey for forecasters.

Problems Encountered/Issues

1st Quarter FY07
- There has been a request for enhancing the OFS FCST NUMCOSAV function used in the Hydrologic Ensemble Hindcaster to generate retrospective initial conditions at the desired time step; no enhancement has been done so far.

2nd Quarter FY07
- The requested enhancement of the OFS FCST NUMCOSAV function in the DR list is not assigned yet.

Graphical Dissemination of Hydrologic Information

Flood Mapping Data Database and Map Library Development

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Doug Marcy

Objective: Develop national database inventory of high resolution elevation data and status of FEMA Cooperating Technical Partners Flood Insurance Map Modernization projects at NWS river forecast point locations.

Milestones

Task	Due Date	Status
Coordinate with FEMA to develop draft of database	Q2	Completed
Incorporate NWS forecast point locations and high resolution elevation data into database	Q3	Completed
~~Incorporate completed, in progress, and future CTP projects into database with model type and contractor~~	~~Q4~~	~~Not Started~~
~~Coordinate with NWS RFCs and WFOs regarding local/regional elevation data sources~~	~~Q4~~	~~Not Started~~
~~Canvas state, county, and local geospatial data providers to determine availability of higher resolution elevation data.~~	~~Q4~~	~~Not Started~~
Detailed topographic and engineering data inventory for 526 NWS forecast points in the Gulf Coast State Region (TX, LA, MS, AL, FL) **SEE BELOW FOR DETAILS**	Q2	Completed
4 Submittal Dates for this inventory.	10/20/06 11/17/06 12/20/06 1/26/07	Completed Completed Completed Completed

Accomplishments/Actions

1st Quarter FY06

- **Work is in progress –** No funding was received in Q1 to complete any work on any of the tasks. Funding will likely arrive to work to begin at the beginning of Q2 (January). Work to complete milestones will begin at this time. Coordination with FEMA on locations of existing Cooperating Technical Partners and future partners has begun regardless of funding. This will form the database of existing partners (counties, municipalities) that have adequate elevation data to meet FEMA specifications to do new Flood Insurance Studies. This database will be the base of the database we will build to capture an inventory of best available topographic data at NWS forecast point locations. An updated database of NWS forecast point locations will be gathered from Hydrologic Services Division. This will be used to compare forecast point locations with existing topographic inventory.

2nd Quarter FY06

- **Coordination with FEMA to develop draft of database completed** – Funding for this project became available early in Q2 (January). Work had already begun to coordinate with FEMA to receive an existing database of counties where Digital Flood Insurance Rate Maps (DFIRMs) have been completed and a table of FEMA plans to complete additional counties in the future. This database will serve as an indicator for where adequate topographic data exists for to meet minimum FEMA requirements for mapping (2 ft contours in flat, coastal plain areas, and 4 ft

contours in higher relief areas). This will be the beginning of an inventory that will be collected and compared to current NWS forecast point locations. A new strategy has been developed during this quarter that will involve coordinating this inventory effort with a much larger effort to produce inundation map libraries for the 5 Gulf Coast states affected by Hurricane Katrina at NWS forecast points, being driven by the 2nd Hurricane Katrina Emergency Supplemental. This effort will involve using an existing CSC contract vehicle (Indefinite Delivery and Indefinite Quantity – IDIQ) to obligate AHPS funds for map library generation by a contractor. The current plan is to include work on the topographic inventory in the statement of work for a larger contract to produce inundation map libraries for the Katrina affected states. The contractor will be instructed to first focus the inventory on the NWS forecast points in the 5 state region and available topographic data for mapping. This information will be used to drive the other portion of the contact to determine which points are suitable for mapping. Then the contractor will expand the inventory to the rest of the country and collect as much as is possible for the amount of funds available (in this case 40K). It is not anticipated that this will purchase a detailed inventory for the rest of the country, but rather a general inventory based on FEMA data and other national datasets, such as NWS forecast point locations. Work on this project will be closely integrated with the larger inundation mapping project. A detailed Statement of Work with cost estimates will be developed during Q3 this year to incorporate this work. It is anticipated that both the Katrina supplemental funds and AHPS funds will be obligated in FY06 for completion of the map libraries and inventory. Project work and final deliverables will likely be carried over to FY07.

3rd Quarter FY06

- As mentioned in the Quarter 2 summary, a detailed Statement of Work was developed in Q3 with cost estimates for producing approximately 35 NWS graphical flood severity inundation map libraries and maps and detailed topographic and engineering data inventory for NWS forecast points in the 5 Gulf Coast State Region (TX, LA, MS, AL, FL) and other parts of the country. The work will be performed by Watershed Concepts, a well known and respected FEMA National Flood Insurance Program contractor. The contractor's proposal pretty much met the Government requirements, except for the nationwide inventory. The cost for the inventories was more expensive than originally thought. The contractor estimate was for 2 to 3 hours per forecast point. At that rate, the cost to inventory the 524 forecast points in the Gulf Coast states was $163,777 and the rest of the country (~3000 sites) was an additional $709,661. Based on this estimate it was decided that Watershed Concepts only do the topographic and engineering data inventory for the 524 NWS forecast points in the Gulf Coast States. This inventory would then be used to prioritize the 35 points that would be used for producing inundation map libraries. The result will be a detailed inventory for 524 forecast points, approximately 15% of the total forecast points. The 40K in AHPS funds for this project will be used in conjunction with the 2nd Hurricane Katrina Emergency Supplemental 540K to put on an existing CSC contract vehicle (Indefinite Delivery and Indefinite Quantity – IDIQ) as an additional task order to Watershed Concepts via EarthData International. Funds will be obligated at the beginning of Q4. The preliminary work CSC did on the inventory will be delivered to Watershed Concepts and used in the final inventory. The inventory will be a database (ESRI Geodatabase) and will be delivered to the AHPS program manager upon completion. It is estimated that the first deliverables for this work (inventory) will be completed six months after the contract has been awarded. This will move the deliverable dates for this project well into FY07 (Q2 most likely) with the final maps and inundation libraries being completed in FY08.

4th Quarter FY06

- The contract with Watershed Concepts was awarded in August of 2006 for a topographic and engineering data inventory of the 524 NWS river forecast points in the 5 Gulf Coast States and 35 inundation map libraries at certain points, selected based on data availability, and need as determined by the NWS Southern Region. A kickoff meeting was held on August 11, 2006 with Watershed Concepts, CSC, and NWS. The project schedule was determined and deliverables were discussed. It was determined that deliverables would be broken down to several submittals by Watershed Concepts for invoice purposes. Four submittals for the data inventory will occur on 10/20/06, 11/17/06, 12/20/06, and 1/26/07. Flood inundation map libraries will be delivered in four submittals as well as follows: 4/27/07, 7/20/07, 10/19/07, 1/11/08. The final

deliverables and project report will be delivered along with the final map submittals on 1/11/08. Monthly reports will document progress and are available through CSC upon request. Progress is on schedule with a first delivery of the geodatabase design for the topographic and engineering inventory occurring on 9/8/06. As mentioned previously, all Q4 milestones for this project were cancelled in Q3 and moved to Q2 of FY07. The 40K funding for this project was combined with 540K from Hurricane Katrina supplemental and put on contract for work in FY07. I am making a recommendation that reporting for this project be captured by Watershed Concepts monthly progress reports from now on.

1st Quarter FY07

- Three submittals were made by Watershed Concepts for this deliverable in Q1, 10/20/06, 11/17/06, and 12/20/06. As of the end of Q1, complete or partial topographic and engineering inventory was delivered for 398 forecast locations in the 5 Gulf States. The rest should be delivered on 01/26/07 making it the entire 526 locations. During this period, NWS submitted 68 forecast point locations to Watershed Concepts for their consideration for prioritization. Watershed Concepts is making sure these are the sites that considered for mapping 35 forecast points. Deliverables included a Geodatabase of the forecast point locations. Each deliverable built on the previous one. The end result will be a Geodatabase of all 526 forecast points and the status of topographic and engineering data availability, with details about data resolution and model types. This project is on schedule to be completed in Q2.

2nd Quarter FY07

- The fourth and final deliverable for this project was made by Watershed Concepts on 01/26/07 This submittal consisted of a personal geodatabase containing topographic and engineering data inventory for all 526 NWS river forecast points. The terrain data inventory was complete for all 526 sites and preliminary engineering data inventory was completed as well for all sites. The submitted personal geodatabase (NOAA_T&E_submittal_4.mdb) can be imported into a previously submitted ArcGIS - ArcMap .mxd file to view the inventories points along with the supporting base data. This inventory will be provided to NWS AHPS program via CD-ROM.

Problems Encountered/Issues

1st Quarter FY06

- No AHPS funding to begin work in Q1 FY06. Funding will likely be available to begin work at the beginning of Q2.
- CSC will likely contract this work out using an Indefinite Delivery and Indefinite Quantity (IDIQ) contract vehicle. CSC will prepare a government estimate in the form of a Statement of Work (SOW) in February of 2006 and let the contract in March of 2006. The scope of the inventory will be determined based on contractor estimates of amount of work, rates, and other costs. CSC will try to get as much of the inventory completed as possible for the 40K of AHPS funds being made available. The robustness and completeness of the inventory will depend on how much can be done for the 40K. CSC will adjust the implementation plan based on the contractor estimates and the final scope of worked submitted for the contract.

2nd Quarter FY06

- As mentioned in Q2 description above, this work will now be incorporated into the inundation map library work that will be contracted out using CSC IDIQ contract vehicle. CSC staff will coordinate with NWS staff to create Statement of Work that will ensure deliverables will meet all previous commitments including the topographic inventory. The inventory will now be used to focus efforts on Gulf Coast to determine which forecast points could be mapped. Once this is completed the inventory will be expanded to include the national NWS forecast point locations. We are taking advantage of the opportunity to combine efforts to get the most efficiency to this mapping process. A larger Statement of Work (SOW) and government estimate will be created to include topographic inventory and inundation map libraries by July 06 and all funds including the Katrina supplemental funds and AHPS funds will be obligated in FY06 with work to be completed and delivered in FY07.

3rd Quarter FY06

- The final estimate from Watershed Concepts came in a little under the 580K total ($578,078.21), leaving $1921.79. I have informed the AHPS program manager of this difference and that the remaining amount will not be direct cited by CSC for the contract, thus leaving it available for other use by other AHPS projects. Due the changing focus of this project and new strategy to get the work done via CSC IDIQ contract, the project deliverables will be moved into FY07 (Q2). I have adjusted the milestones accordingly. There will likely be no deliverables in Q4 of FY06, but rather an update on status of completing the inventory for the Gulf Coast States.

4th Quarter FY06

- IDIQ contract with Watershed Concepts was awarded in August 2006 and kick off meeting occurred on August 11, 2006. Deliverables for this project will be in four submittals: 10/20/06, 11/17/06, 12/20/06, and 1/19/07. All Q4 milestones were cancelled for this project except for the final topographic and engineering data inventory to be delivered in Q2 FY07 as an ESRI geodatabase for 524 NWS river forecast points in (TX, LA, MS, AL, FL). Coordination with SRH will occur to choose 35 mapping locations.

1st Quarter FY07

- None

2nd Quarter FY07

- Initial results of the inventory indicate that 180 of the 526 sites were located on stream reaches for which detailed NFIP studies have been performed. Additionally, initial results showed that 170 of the 526 sites were located on stream reaches that have studied by approximate methods, so that no detail studies exist for those sites. Finally, there are 176 sites for which initial review shows no NFIP study at all. Watershed Concepts is still in the process of finalizing the engineering inventory for these sites. They are also are in the process of reviewing ongoing NFIP studies to determine if any of the forecast points are affected by active or ongoing studies. Watershed Concepts also submitted a spreadsheet containing 56 forecast points that had adequate topographic data and engineering data to pursue mapping. Of these points, only 10 were on the original list of 67 priority points the NWS submitted. NWS is now prioritizing this list of 56 and will submit to Watershed Concepts for making a data request for FEMA. Then Watershed Concepts will begin creating inundation map libraries and making those deliveries to NWS. That work will be captured on another Graphical Dissemination Team Project (now lead by Frank Richards).

GIS Based Information Dissemination System

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Wendy Pearson, CRH and Dr. Shripad Deo, CIRA.

Objective: Develop a GIS-based display system to present a variety of hydrologic information to meet the needs of local, regional, and national users

Milestones

Task	Due Date	Status
Provide training for IMS system team	Sep 2003	Complete
Hardware and software procured and installed	Sep 2003	Complete
Contract support allocated for IMS development work	Sep 2003	Complete
Develop GIS-based information dissemination system	Sep 2004	Ongoing
Additional Hardware and software procurement	July 2005	Complete
Install additional hardware and software	Jan 2006	Complete
Modify national AHPS map service to use .xml files	Sep 2006	Complete
Stress Test new hardware and software configuration	Sep 2006	Moved from Q2 to Q4 FY07
Provide training for CRH IT staff to support ArcIMS 24/7	Sep 2006	Complete
Move application to "operational" environment	Sep 2006	Moved from Q2 to Q4 FY07

Accomplishments/Actions

1st Quarter FY05
- Wrapped up development of ArcIMS web service (very similar to static national AHPS web page) fed real-time .mxd files. The ESRI ArcIMS system allows for customer selectable graphics to zoom to the level of interest and obtain information about the river gauge locations.

- Created project plans for FY05 to work with OHD and Coastal Services Center:
  - Evaluate prototype ArcIMS system design
  - Incorporate graphical E19s in CRH project
  - Recommend some products for ArcIMS dissemination

- Planned for MySQL database to feed ArcIMS.

2nd Quarter FY05
- Determined requirement for ESRI ArcInfo software.
- Researched system design options.
- Discovered .xml files would not be available in Q3 of FY05 (see below).
- Contractor wrote program to parse data from .xml when it becomes available.
- Determined SDE will be utilized to manage shape files to increase accessibility efficiency.

3rd Quarter FY05
- Purchased additional hardware and software.

4th Quarter FY05
- Began installation of second server and additional software.

1st Quarter FY06
- Completed installation of second server and additional software.

2nd Quarter FY06
- Researched possible training options for CRH IT staff.

3rd Quarter FY06
- Began working with new contractor on IMS application service.

4th Quarter FY06
- CRH IT Training was completed.
- Map Service was modified to use .xml.

1st Quarter FY07
- No activity during this quarter

2nd Quarter FY07
- Project is on Hold awaiting CR RD decision on recommendations regarding GIS in CR.

Problems Encountered/Issues

1st Quarter FY05
- Halted work on IMS web service, very similar to static national AHPS web page, due to transition from .mxd files to .xml files by contractor, John Bollinger. Will resume work on this IMS web service when .xml files are fed to CR web farm.

2nd Quarter FY05
- The timeline for .xml files to be available for all forecast points has been delayed and will not be available until AWIPS OB6.0 installs are complete. We will continue development on .xml files that are available but will not be able to incorporate all sites due to the less aggressive timeline.
- Additional hardware and software procurement decisions were moved to Q3 due to further research needed into future system design. Need to determine whether focus should be on access and availability or high security standards at this time.

3rd Quarter FY05
- Contract project leader took a job in a different city with a different agency so, I will be spinning up a new contractor in Q4 FY05.
- Graphical E19 data for incorporation in this ArcIMS project will not be available until FY06.

4th Quarter FY05
- Began spinning up a new contractor in Q4 FY05.
- Graphical E19 data for incorporation in this ArcIMS project will not be available until FY06.
- National lead on FLDIMS project has changed hands.
- Hydrogen .xml data will not be available for all WFOs until Q3 of FY06 due to push back of installation of AWIPS OB6.0 Phase III.

1st Quarter FY06 - None.

2nd Quarter FY06 - None

3rd Quarter FY06 - None

4th Quarter FY06
- It was determined the .xml may not be the best data feed for this map service. Delay in gaining access to CRH development server for stress testing so stress testing must be moved to FY07.

1ˢᵗ Quarter FY07
- N/A

2ⁿᵈ Quarter FY07
- Project is on Hold awaiting CR RD decision on recommendations regarding GIS in CR.

Future Enhancements for FY08-FY10
- Link to live AHPS web pages for seamless Internet navigation.
- Incorporate census data in this system to enhance hydrologic outlooks, watches, and warnings by taking today's NWS wording of a hazard of major flooding with river levels rising to 28 feet on the Missouri River in Jackson county Missouri, to… "***There is a threat of major flooding with the river rising to 28 feet on the Missouri River in Jackson county in Missouri with potentially 300,000 people and 75,000 homes and businesses likely to be affected***."
- Work with CRH Climate Services, to incorporate low flow database information in graphical format utilizing ArcIMS.
- Explore graphical dissemination of ESPADP digital data, NDFD shapefiles, NWS Doppler radar shapefiles, precipitation data, water supply information, water quality information, and climate data.
- Research solutions for data download capabilities via IMS.

Real Time Inundation Map Evaluation

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Geoff Bonnin

Objective: Identify products and ways of graphically disseminating hydrologic and forecast information in a format that would help customers and managers to visualize the impact of water levels. This will aid the decision makers regarding actions to be taken to protect people and property.

Milestones

Task	Due Date	Status
Evaluate existing map generation process	Q1-FY07	Complete
Review the RFI to determine options to generate inundation maps	Q2-FY07	RFI's reviewed.
Analyze and recommend methodology for map generation/dissemination. Write Report	Q3-FY07	

Accomplishments/Actions

1st Quarter FY07
- The Request For Information (RFI) was published in the Federal Business Opportunities on 01/10/07. Written responses must be received by February 10, 2007. The team will continue to work. Attended a meeting with the Susquehanna River Basin Commission (SRBC) about inundation mapping. There might be a collaborative effort there. The team continues looking into the different projects to evaluate them.

2nd Quarter FY07
- We received 22 RFI responses. These were evaluated by the team members. There was a combined meeting with XEFS team members to combine efforts and develop a vision. During the meeting we determined that a plan should be developed after studying the requirements needed to provide inundation maps. These maps would be provided at selected locations.   In this plan a partnership between NWS and a Local Entity (LE) that might express the need for inundation maps in their area should be considered.

- This plan should identify needs, products and/or actions for NWS and the LE. The plan should present a set of options and the level of involvement from each part. It also should include initial implementation costs as well as maintenance, a MOU about exchange of information, commitments, etc. A methodology should be proposed having a vision of what is the full spectrum of products/services the NWS can provide. This will in turn tap on cost, expertise needed, resources; in general, what is necessary for this "project" to happen. After the plan is drafted, then it can be determined if the proposed end product(s) is worth the effort. The pilot projects (PPs) will be used as lessons learned.

Problems Encountered/Issues

1st Quarter FY07
- The RFI was initially published under the wrong classification.

2nd Quarter FY07 – None

Static Flood Inundation Maps
Web-Page Development and Deployment

Theme: Graphical Dissemination of Hydrologic Information and Web Page Deployment

Management Lead: Frank Richards

Objective: Develop AHPS web page interface and Deploy available flood inundation maps

Milestones

Task	Due Date	Status
Develop and present initial look of maps for approval	Nov. 2006	Complete
Produce prototype for review and approval	Jan. 2007	Complete
Produce first operational location in North Carolina for test, review, and comments	Apr. 2007	Complete
Produce final output for first operational location in North Carolina	Jun. 2007	
Complete installation of all available locations in North Carolina	Sep. 2007	
Complete installation of available locations in Pennsylvania	Dec. 2007	
Complete installation of maps produced by hurricane supplemental contract	Dec. 2008	

Accomplishments/Actions

1st Quarter FY07
- Completed initial look of web page interface and map capability
- Completed prototype, on CD, of initial flood inundation map location

2nd Quarter FY-7
- With the departure of Tom Donaldson, Frank Richards will coordinate this task
- Orion developed a protocol to process information for the Web that will expedite production
- Watershed completed an inventory of 57 locations with available model and elevation information – 6 locations were selected for the first group of maps

Problems Encountered/Issues

1st Quarter FY07
- Schedule for North Carolina locations may be impacted by web farm consolidation process.

2nd Quarter FY07
- There have been delays in identifying locations that may delay completion of the first group of locations, but final completion of the project may not be delayed

Software Architecture Enhancements

Calibration - Complete IDMA Study

Theme: Software Architecture Enhancements

Management Lead: Mike Smith

Objective: The objective of FY05 work will be to conduct a scientific study to evaluate the impacts of not performing (historical) data quality control procedures on during hydrologic model calibration. FY05 work will complement the initial results from Eric Anderson presented at the 2004 DOH/RDM workshop. The FY05 results will be posted on the HL Calibration web site and will also be submitted to a journal for publication.

Milestones

Task	Due Date	Status
9. Complete Eric Anderson's initial evaluation and put on HL web site	Jan. 27, 2005	Complete
10. Develop literature review to establish how NWS procedures fit into the published literature of accepted practices.	12/31/2004	Complete
11. Develop outline of journal paper.	12/31/2004	Complete
8. Obtain data for additional analyses	5/31/2005	Complete
9. Calibrate basin with uncorrected/corrected data	5/15/06	delayed
10. Analyze calibration results	6/1/2006	delayed
11. Submit paper to OHD –Review and peer-reviewed journal for potential publication.	7/1/2006	delayed

Accomplishments/Actions

1st Quarter FY05
- Determined that the NWS double mass analysis procedures fit well into the body of existing quality control procedures for historical data. Climate-change researchers regularly use such procedures and stress their importance.
- Eric Anderson's initial work shows that biases can result from not corrected data for man-made inconsistencies.

2nd Quarter FY05
- Given problem described in Q1 above, found study basin with hourly discharge data and a nearby station with a documented station move.
- Found more studies in the literature on the effects of calibration data on model calibration.
- Discussed with Seann Reed a strategy to test the effects of calibration data quality on model forecasts.

3rd Quarter FY05
- Found another peer-reviewed journal article to support the need for the analysis.
- Began hourly calibration of ELDO2 using MAP time series with and without the consistency correction.

4th Quarter FY05
- Used data from the current IDMA study to help evaluate the MPE-Reanalysis data to be used for DMIP 2.

1st Quarter FY06
- Will continue calibration of the basin in conjunction with calibration of basins for DMIP 2

2nd Quarter FY06

- Work resumed after the lumped calibrations for DMIP 2 begun.
- Found journal papers confirming the test approach and need for such investigations (Journal of Hydrology, Vol. 320, pages 62-86).

3rd Quarter FY06
- Began to revisit this project with calibration of DMIP 2 basins.

4th Quarter FY06
- N/A

1st Quarter FY07
- Calibrated ELDO2 test basin for DMIP 2 with MAPX data and sent to Eric Anderson for review. These parameters will help evaluate the parameters derived via calibration with raingauge data. Studied paper on calibration with MAPX and raingauge data as a surrogate to this problem (Calibration of a rainfall-runoff model using radar and raingauge data, Adv. In Geosciences, 2005)

2nd Quarter FY07
- Updated the HOSIP documents to reflect the current status of this project.

Problems Encountered/Issues

1st Quarter FY05
- Discovered that it is difficult to calibrate a basin using mean daily flow given minor changes in the MAP time series (caused by lack of consistency corrections). Proposed solution is to use hourly computations and data.

2nd Quarter FY05 - None

3rd Quarter FY05 – None

4th Quarter FY05
- Work delayed as Mike was assigned to lead River Mechanics Group as well as Hydrology group. George Smith ok'd the delay.
- Work delayed to focus on 1) DMIP 2 cost estimates for funding from Water Resources Program (No AHPS funding for DMIP 2 granted), 2) DMIP 2 precipitation forcing problem: MPE Reanalysis data found to be lacking and needed more analysis.

1st Quarter FY06
- Will continue calibration of the basin in conjunction with calibration of basins for DMIP 2.

2nd Quarter FY06 - None

3rd Quarter FY06
- Task put on 'back burner' due to crush of other projects.

4th Quarter FY06
- Task delayed in order to launch DMIP 2 western basin experiments. Will continue this task when calibrating the DMIP 2 basins.

1st Quarter FY07
- Task delayed yet again due to tasks with higher priority

2nd Quarter FY07
- Task delayed yet again due to tasks with higher priority

Calibration - Re-Implement the Interactive Calibration Program and Enhance

Theme: Software Architecture Enhancements

Management Lead: Jon Roe

Objective: Re-Implement the Interactive Calibration Program (ICP) from the new set of functional requirements generated from an FY04 contract task. Then, improve the functionality by implementing enhancements identified by the Theme Team.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q3, FY05	Complete
Pass HOSIP Gate 1.	Q4, FY05	Complete
Write Statement Of Objectives (SOO) for contractor tasking.	Q3, FY05	Complete
Review Statement Of Work (SOW) from contractor.	Q4, FY05	Complete
Add requirements for enhanced functionality to the HOSIP Concept of Operations document.	Q2, FY06	Complete
Submit project through OSIP to AWIPS SREC to be included in AWIPS OB8.x release.	Q2, FY06	Complete
Contractor writes HOSIP Stage 2 and 3 documents.	Q3, FY06	Complete
Pass HOSIP Gates 2 & 3 for Re-implementation.	Q3, FY06	Complete
Contractor begins Operational Development for Re-implementation	Q4, FY06	Work Begun
Contractor completes Re-implementation of ICP software and all required documentation and testing	Q1, FY07	Underway
Software and documentation are delivered to AWIPS	Q1, FY08	Not Started
Write SOO for contractor tasking for enhancements.	TBD	Not Started
Review contractor's SOW for enhancements.	TBD	Not Started

Accomplishments/Actions

1st Quarter FY05
- We completed project identification, budgeting, and planning.

2nd Quarter FY05
- We started writing the HOSIP Stage 1 documentation.

3rd Quarter FY05
- HOSIP Stage 1 NID and SON were completed.
- SOO was completed and forwarded to Contracts for final processing.

4th Quarter FY05
- HOSIP Gate 1 was passed
- Technical proposal submitted by Contractor was accepted by OHD
- The task for RTi was awarded very late in Q4

1st Quarter FY06
- We completed CONOPS and Project Plan
- HOSIP Gate 2 was passed

2nd Quarter FY06

- The contractor completed the Stage 3 research and submitted the Research Report.
- The contractor is creating the HOSIP material for Gate 3, now expected in Q3, FY06
- Both the Re-implementation project and the enhancements from the AHPS Theme Team were submitted through OSIP to the AWIPS SREC for potential inclusion in AWIPS OB8.x releases.

3rd Quarter FY06

- HOSIP Gate 3 was passed.
- OHD and RTi agreed to a contract for HOSIP Stage 4 (operational development).

4th Quarter FY06

o The contractor held a kickoff meeting for the operational development phase in early August.
o The contractor has delivered revised Concept of Operations and decomposed technical requirements documents.
o The contractor has delivered a draft design document.

1st Quarter FY07

- As planned, the contractor delivered several prototypes with increasing functionality, which were reviewed by OHD and RFC personnel.

2nd Quarter FY07

- The contractor delivered a release candidate with all the required functionality. HSEB, HSMB and three RFCs: NERFC, NWRFC and WGRFC are currently testing this software.

Problems Encountered/Issues

1st Quarter FY05

- We will be having an off-site contractor work on this project. The extent of the implementation to be completed with this work will depend upon the contractor's response to our Statement of Objectives (SOO). It is not clear at this point whether the allowed budget will cover complete re-implementation of the ICP by the contractor. This potential shortfall may be exacerbated by having to retrofit early HOSIP documents during this funded item.
- This project has essentially completed the technical work necessary to pass HOSIP Gates 1, 2, and 3 but the work was performed in FY04 (pre-HOSIP) by an outside contractor culminating in a complete functional requirements document. Now, the current task will have to fill in the required HOSIP deliverables and formally pass the Gates to get completed.

2nd Quarter FY05

- We have moved the expected date for passing HOSIP gate 1 to the third quarter.

3rd Quarter FY05

- Due to Edwin Welles' departure from OHD we have moved the expected date for passing HOSIP Gate 1 to the fourth quarter.

4th Quarter FY05

- We experienced a delay because the Contractor's first technical proposal was unacceptable to OHD and had to be re-written and re-submitted. The second proposal was acceptable, but Contracts was unable to award the task until the end of Q4.
- Due dates for HOSIP Stage 2 and 3 documents, and HOSIP Gates 2 and 3, have been moved to Q2, FY06 to match the Contractor's SOW schedule. Follow-on activities have been adjusted accordingly but are subject to negotiation under Phase 2 of the contract task.

1st Quarter FY06

- We completed HOSIP Gate 2 CONOPS and Project Plan documents. HOSIP Gate 2 (January 18th, 2006) review went well with minor changes in CONOPS and Project Plan.

2nd Quarter FY06
- Progress in Stage 3 has been slower than expected.
- The contractor has not yet submitted a separate SOW for the operational development phase (HOSIP Stage 4) for the re-implementation. All schedule milestones for the HOSIP Stage 4 work and implementation into AWIPS are TBD, pending the contract being established.
- The funds allocated in FY05 will not be sufficient to complete the operational development, so FY06 funds will be used.
- Separate SOOs and SOWs will eventually be created for the enhancements.

3rd Quarter FY06
- HOSIP Stage 3, Applied Research & Analysis, took quite a bit longer than originally intended.

4th Quarter FY06
- None

1st Quarter FY07
- Reports from several reviewers have raised concerns about slowness in the prototypes. The development contractor is investigating ways to improve performance.

2nd Quarter FY07
- The performance of the application is still a concern and the contractor is continuing to investigate and try to improve it.

Streamflow Regulation Tools – Phase 1

Theme: Software Architecture Enhancements

Management Lead: Jon Roe

Objective: To enhance existing NWSRFS models to aid with modeling the Streamflow Regulation. This is Phase 1 of the tool enhancements.

Milestones

Task	Due Date	Status
OHD write HOSIP Need Identification Document.	Q4 FY05	Complete
OHD write Statement of Objectives for task and deliver to Contracts.	Q3 FY05	Complete
OHD Review/Accept Statement of Work from Contractor.	Q4 FY05	Complete
Pass HOSIP Gate 1.	Q1 FY06	Complete
OHD Receive HOSIP Gate 2 documents.	Q1 FY06	Complete
Pass HOSIP Gate 2.	Q1 FY06	Complete
OHD Receive HOSIP Gate 3 documents.	Q1 FY06	Complete
Pass HOSIP Gate 3.	Q1 FY06	Complete
OHD receive/review HOSIP Gate 4 design documents.	Q2 FY06	Complete
OHD receive and MBRFC review HOSIP Gate 4 test documents.	Q2 FY06	Complete
OHD receive contractor developed code and deliver OHD compiled code to MBRFC.	Q2 FY06	Complete
MBRFC test functions.	Q3 FY06	Complete
OHD Receive remainder of HOSIP Gate 4 documents.	Q3 FY06	Complete
Deliver Software and documentation to AWIPS for release OB8.1	Q1 FY07	Complete

Accomplishments/Actions

1st Quarter FY05
- Project planning

2nd Quarter FY05
- The SOO is currently being developed and will be available in early May.

3rd Quarter FY05
- The SOO was completed and delivered to Contracts.

4th Quarter FY05
- The task was awarded; work began on Sept 15
- HOSIP NID and SON written and submitted
- HOSIP Gate 1 delayed to Q1 FY06

1st Quarter FY06
- HOSIP Gate 1 passed.
- Since this is an enhancement project, no research & analysis is needed. Accordingly Gate 2, and 3 are combined. Deliverables included the Project Plan and the CONOPS for Stage 2 and

Stage 3 was delivered and accepted by OHD. The project has passed both Gate 2 and Gate 3 meetings. The Contractor delivered the Design Document on 01/10/2006. Review on the Design Document is in progress in OHD. Some names and wording in the Project Plan, and CONOPS may need to be changed to agree with the Design Document.

2nd Quarter FY06
- OHD and the Contractor reached agreement on the design and test documents.
- The Contractor was completing the internal testing at the end of the period. Delivery of the tested software to OHD and MBRFC is expected in April 2006.

3rd Quarter FY06
- The Contractor delivered all software and documents required by the contract.

4th Quarter FY06
- OHD completed preparations for submitting documentation for AWIPS reviews.

1st Quarter FY07
- Software and documentation were provided to AWIPS. The software was successfully tested by Joe Heim, OHRFC, as part of the AWIPS OB8.1 Pre-Integration Testing (PIT) December 12-14.

2nd Quarter FY07
- AWIPS completed acceptance testing on March 28. The software will be deployed as part of AWIPS OB8.1.

Problems Encountered/Issues

1st Quarter FY05
- We will be asking the contractor to complete the enhancements listed below in our Statement of Objectives. The schedule and the number of tasks we complete will depend upon the response from the contractor.
    - (a) Currently, the CONS_USE operation requires specification of an input streamflow time series from which the diversion will be withdrawn. Make specification of the input time series optional to make it easier to simulate a case where the water source is a reservoir.
    - (b) Currently, CONS_USE return flows are assumed to return to the diversion point and are available for diversion. In many cases return flows return well downstream of the diversion point, or even exit the basin. Allow the user to specify if the return flows are available for diversion to provide the user more flexibility in the use of the operation.
    - (c) Include an option in the CONS_USE operation to have the operation compute return flows only, and to do so based on a given diversion time series. This would reflect situations where the actual diversion and subsequent return flow were limited by factors other than those currently considered in the operation.
    - (d) Enhance the LOOKUP3 operation to allow a date to be specified as one of the independent variables.

- The Contractor will also be responsible for writing all HOSIP Gate 2, 3, and 4 documents.
    - (a) Gate 2 documents include the Concept of Operations, Business Case, Operational Requirements Document, Statement of Need, Work Plan.
    - (b) Gate 3 documents include Detailed requirements
    - (c) Gate 4 documents include Design documents, Test Plan, Test Procedures, Test Results, code, Training Materials, User manuals, and System manuals.

2nd Quarter FY05 - None

3rd Quarter FY05
- The development of the SOO for the contractor was significantly delayed due to labor constraints within OHD for conducting many simultaneous contracting activities for task in progress and tasks to start up.

- The Contractor SOW was received in early July and will be accepted by OHD so work should commence by late July.

4th Quarter FY05
- HOSIP administration resource crunch delayed HOSIP Gate 1 to Q1 FY06
- Contractor's schedule in SOW calls for the following:
  - (a) Gate 2 documents and Gate 2 passage by Oct 15
  - (b) Gate 3 documents and Gate 3 passage by Nov 15
  - (c) Design, code, test, and integration by Jan 15 2006
  - (d) Gate 4 documents by Jan 15 2006
  - (e) Beta test at MBRFC by Feb 15 2006
  - (f) Gate 4 passage by Feb 15 2006

  Due dates above have been updated to reflect Contractor's schedule.

1st Quarter FY06
- No outstanding problems or delays found.

2nd Quarter FY06
- The project was delayed because the amount of time and effort needed to complete the design and implementation of the changes were greater than expected.

3rd Quarter FY06
- The technical issues with the design, implementation and testing procedures were resolved.
- Tester can not follow step-by-step using the procedures given in the Test Results   OHD has rewritten the test procedure in Korn Shell scripts.

4th Quarter FY06
- None

1st Quarter FY07
- None. The formal Integration Handoff to the AWIPS Contractor, Raytheon, has been delayed until January 12, 2007.

2nd Quarter FY07 - None

Streamflow Regulation Accounting

Theme: Software Architecture Enhancements

Management Lead: Mike Smith

Objective: **T**o continue the development of a strategy for AHPS implementation for river basins where the regulation of stream flow is substantial. This strategy will enable MBRFC and other RFCs to effectively account for the effects of this regulation in their conditional simulations in ESP and thereby provide consistent, accurate, science-infused long-range probabilistic forecasts.

Milestones

Task	Due Date	Status
Implement SRA on the Cache la Poudre River sub-basin	Q2	Completed on time
Implement SRA on S. Platte River tribs abv Kersey and blo Henderson	Q2 (FY06)	Completed on time
Finalize SOO for next phase	Q2 (FY06)	Completed Q3
Implement SRA on S. Platte River basin abv Chatfield Dam	Q3(FY07)	On track

Accomplishments/Actions

1st Quarter FY05
- Work began on the implementation of the Cache la Poudre sub basin; calibration of the system was done for the three approaches; two MBRFC staff members visited RTI to collaborate on regulation modeling of the Cache la Poudre sub-basin; a specific plan for implementation was developed, documented, and is now being executed.

2nd Quarter FY05
- The implementation plan for the Cache la Poudre sub-basin was executed. The draft report was submitted by RTi and reviewed by MBRFC and OHD. A training session and kickoff meeting to identify the next area to be modeled is planned for next quarter.
- Three approaches to modeling in the ensemble forecasting mode were applied to the Cache la Poudre sub-basin: (1) ignoring the effects of regulation, (2) utilizing aggregated historical records of the regulation practices, and (3) modeling the regulation using a combination of NWSRFS operations. Although the statistics did not show a marked improvement over using the observed data, it was determined that in order to do ensemble forecasting in the Cache la Poudre, modeling the streamflow regulation was the only viable option.

3rd Quarter FY05
- The SOO and the proposal for the next area of the South Platte to be modeled were processed.

4th Quarter FY05
- Work commenced on the Data Collection and Processing and Hydrologic Model Calibration subtasks. Significant regulations were identified and wastewater treatment plant flow information was incorporated in the flow naturalization process. Pool elevation and storage data were obtained for reservoirs in the system, and a water balance analysis was completed for the South Platte sub-basins.
- The hydrologic calibrations were reviewed for consistency and the hydrologic model parameters were finalized for each sub-basin.

1st Quarter FY06
- Made adjustments to the LSLC2 to improve high flow simulations.

- Modeling approaches for each sub-basin were determined and the initial regulation models for each sub-basin were calibrated.

- Initialized operational forecast system files for probabilistic verification of the IDOC2, LNSC2, and PTLC2 segments. RTi made hindcast simulations and prepared verification statistics for the 90-day volume, 90-day peak discharge, and minimum 7-day mean flow (for a 90-day window) for each location for April 1, May 1, and July 1. The computed statistics included the Ranked Probability Skill Score, Reliability, and Discrimination. Initialization files, verification data and verification graphics were delivered to MBRFC.

2nd Quarter FY06
- All asks completed for the second area of South Platte. Final report, updated National Strategies report, and updated South Platte Implementation report completed. Final calibration decks and initialization files also received.

3rd Quarter FY06
- SOO finalized and CD-435 submitted for next phase of work.

4th Quarter FY06
- Notice to Proceed issued in mid September for next phase for South Platte basin above Chatfield Dam.

1st Quarter FY07
- Work progressing. Completed initial analysis of diversion records and flow naturalization, and began reviewing resulting natural flow time series agains total flow records and in initial hydrologic calibration models. Compiled MAT data from MBRFC and computed potential evapotranspiration estimates. Began setting up the natural flow water balance analysis. Reviewed and confirmed unit hydrographs, basin areas, and elevation breaks provided by the MBRFC. Worked on set up of calibration decks for the natural flow calibrations, beginning with initial calibration decks provided by the MBRFC. Began initial calibration on headwater basins. The flow naturalization process suggested high amounts of regulation for certain sub-basins, which appears inconsistent with comments from Denver Water. Various documents describing regulation in the region were reviewed to help better understand the regulation in the basin.

2nd Quarter FY07
- Hydrologic calibration decks received.
- Nearing completion of regulation model calibration decks. Completed calibration of Cheesman, Antero, and Elevenmile Reservoirs and diversions and returns within all segments except Spinney and Chatfield. Adjustments to Spinney and Chatfield Reservoirs being made based on new data received from Denver Water and Corps of Engineers.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 - None

1st Quarter FY06 – None

2nd Quarter FY06 – N/A

3rd Quarter FY06

- HL project responsibility transferred to the Hydrologic Modeling Group.

4th Quarter FY06 – None

1st Quarter FY07
- In November, MBRFC and RTi agreed to minor delays in some of the deliverables, as long as the final project schedule is not delayed. RTi noted problems obtaining information from the City of Aurora regarding Spinney Reservoir. MBRFC would try to contact them for this information.

2nd Quarter FY07
- MBRFC and RTi agreed to minor delay of delivering regulation model decks in order to incorporate late data received about Spinney and Chatfield Reservoirs and problems with the RAINEVAP method in RES-J. Delivery of final report not expected to be delayed.

Frozen Ground Algorithm SAC-SMA Enhancement

Theme: Software Architecture Enhancements

Management Lead: Jon Roe

Objective: Deliver enhanced Frozen Ground Algorithm as part of the AWIPS national baseline, using OHD's evolving CHPS architecture

Milestones

Task	Due Date	Status
Modify HOSIP documents and submit to OSIP for Gate 1	Q2, FY06	Completed
Pass OSIP Gate 1	Q2, FY06	Completed
Modify HOSIP documents and submit to OSIP for Gate 2	Q2, FY06	Completed
Pass OSIP Gate 2	Q2, FY06	Completed 3/21/06
Modify HOSIP documents and submit to HOSIP for Gate 3	Q3, FY07	Underway
Pass HOSIP Gate 3	Q3, FY07	Not started
AWIPS Requirements Review	Q3, FY07	Not started
AWIPS User Interface Review	Q4, FY07	Not started
AWIPS Design Review	Q4, FY07	Not started
AWIPS Test Plan/Procedures Review	Q4, FY07	Not started
Check-in software for Pre-Software Integration Testing (PIT)	Q1, FY08	Not Started
Test software during PIT	Q1, FY08	Not Started
AWIPS Integration Readiness Review	Q1, FY08	Not started

Accomplishments/Actions

1st Quarter FY06
- Project on hold waiting for appropriate internal OHD resources. The project is in HOSIP stage 3.
- Decision made to use OHD internal resources vs as a contracted-out effort.

2nd Quarter FY06
- In accordance with new AWIPS rules, this project was entered into OSIP in order to be eligible for AWIPS OB8 SREC consideration (OSIP project number 06-018).
- OSIP Gate 2 was held on 3/21/06. Project was unconditionally approved and redirected to AWIPS SREC for prioritization.
- HOSIP Gate 3 documents submitted for review on 1/30/06. Re-write requested. Waiting for Gate 3 to be rescheduled.

3rd Quarter FY06
- This project assigned to AWIPS Release OB8.3 by the AWIPS SREC in May.

4th Quarter FY06
- No HSEB resources were available during this quarter. This should not jeopardize the ability to incorporate the algorithm in the lumped model for the AWIPS OB8.3 release.

1st Quarter FY07

- Direct work on enhancing the lumped NWSRFS model was deferred in favor of implementing the enhancements first in the CHPS FEWS pilot system. This decision will allow the developer to become very familiar with implementing the enhancements. The timing of the CHPS FEWS pilot and the AWIPS OB8.3 release will allow OHD developers to incorporate the frozen ground enhancements in both projects in a more efficient manner than working on both projects in parallel. The project milestones were updated to reflect this new plan.

2nd Quarter FY07
- Planning and review and revision of the documents for HOSIP Gate 3 began.

Problems Encountered/Issues

1st Quarter FY06
- Project resumption suffering from lack of appropriate internal OHD resources.

2nd Quarter FY06
- OHD project funding uncertainties coupled with lack of appropriate internal OHD resources continues to delay forward movement toward HOSIP/OSIP Gate 3.

3rd Quarter FY06
- No progress this quarter due to AWIPS OB7.2 pressure on OHD resources. AWIPS KAP activities in 4th Quarter FY06 are also expected to significantly limit OHD's ability to provide HOSIP Gate 3 support. OHD should be able to free up some resources in 1st Quarter FY07.
- Issues must be resolved between the development of the prototype against today's NWSRFS versus CHPS modernizations.
- Issues must be resolved between the development of the prototype for the lumped model versus the need for the algorithm in both the lumped model and the distributed model.

4th Quarter FY06
- Completion of HOSIP Gate 3 was not accomplished due to unresolved science issues which delayed completion of HOSIP Gate 3, as well as a lack of HSEB resources.

1st Quarter FY07
- Resources were still not available to work directly on this project, but a plan for addressing this project is described in the accomplishments above.

2nd Quarter FY 07
- Completion of work on the CHPS FEWS pilot took longer than planned but we have finally resumed work on this project.

NWSRFS Reservoir Tools Enhancements
(Formerly Streamflow Regulation Tools – Phase 2)

Theme: Software Architecture Enhancements

Management Lead: Jon Roe

Objective: To enhance existing NWSRFS models to aid with modeling reservoirs.

Milestones

Task	Due Date	Status
Add *potential* requirements to the existing HOSIP Concept of Operations document.	Q2, FY06	Completed
Submit project to AWIPS SREC to be considered for inclusion in Release OB8.3.	Q2, FY06	Completed
HSD surveys RFC for potential requirements, validity and priorities.	Q2, FY06	Completed
AHPS FY 2006 SAE Theme Team confirms requirement priorities in from the RFCs.	Q3, FY06	Completed
Create Statement of Objectives (SOO) to contract the work.	Q3, FY06	Completed
Review Statement of Work (SOW) from contractor.	Q4, FY06	Completed
Update HOSIP documents for HOSIP Gate 2 as needed.	Q1, FY07	Completed
Update HOSIP documents for Gate 3 as needed.	Q2, FY07	Completed
Pass HOSIP Gates 2 and 3.	Q2, FY07	Not Started
Pass HOSIP Gate 3.	Q3, FY07	Not Completed (was expected Q2, FY07)
Begin Operational Development.	Q3, FY07	Not Started
Complete Operational Development.	Q4, FY07	Not Started
Deliver software and documentation to AWIPS for release OB8.3	Q1, FY08	Not Started

Accomplishments/Actions

2nd Quarter FY06
- HOSIP Gate 3 for Phase 1 identified the POWERGEN function as a potential Phase 2 requirement.
- Added potential Phase 2 requirements to the existing HOSIP Concept of Operations document.
- Submitted project through OSIP to the AWIPS SREC to be considered for inclusion in the OB8.3 release.
- OCWWS/HSD conducted a survey of the RFCs to consider the potential enhancements outlined by the AHPS FY 2006 Software Architecture Enhancements (SAE) Theme Team together with suggestions from a 2004 workshop on streamflow regulation accounting tools and methods.

3rd Quarter FY06
- We received responses from the SAE theme team concerning the priorities of the Phase 2 requirements.
- We issued a Statement of Objectives for Phase 2 identifying five functions to be implemented if funds permit.

4th Quarter FY06
- We revised the Phase 2 activities to concentrate on two enhancements: a multi-valued time series lookup operation and utilizing standard NWSRFS static rating curves in Res-J.

- We accepted a Statement of Work from the contractor for the revised Phase 2 activities.

1st Quarter FY07
- HOSIP Concept of Operations and Project Plan were finally ready for HOSIP Gate 2 on January 17, 2007.

2nd Quarter FY07
- Passed HOSIP Gate 2 on March 2.
- Saud Amer arrived as the new contractor on-site liaison.

Problems Encountered/Issues

2nd Quarter FY06
- Most attention has been focused on completing Phase 1.
- Jon Roe has been slow in convening the AHPS FY 2006 SAE Theme Team to get the final say on Phase 2 tool priorities – expected to occur in Q3 of FY 2006.

3rd Quarter FY06 - None

4th Quarter FY06
- The funds expected to be available forced a reduction in the number of enhancements planned for Phase 2.

1st Quarter FY07
- Personnel absences delayed completion of the HOSIP Gate 2 documents.
- Completing the HOSIP internal review of the Gate 2 Documents took longer than expected.

2nd Quarter FY07
- The completion of the Stage 3 activities took longer than the contractor expected.
- Continued changes to the format and expected content of the Gate 3 documents delayed the submission of the documents.

Expand the Hydrology XML Consortium – Phase 3

Theme: Software Architecture Enhancements

Management Lead: Jon Roe

Objective: To continue the definition and development of a new software architecture and infrastructure to support NWS hydrologic operations. Move into Phase 3 of the expansion of the Hydrology XML Consortium (HydroXC). Phases 1 & 2, previously completed, established the HydroXC and developed a preliminary schema. The Phase 3 expansion will develop sub-schemas and a data adapter to read and write SHEF (for a subset of data types) and generate XML.

Milestones

Task	Due Date	Status
Write Statement Of Objectives (SOO) for contractor tasking to continue the overall expansion of the Hydrologic XML Consortium, Phases 2, 3, and 4.	Q3	Complete
Incorporate the requirements of the "FLDVIEW Data Interface (XML)" project into the SOO. The FLDVIEW interface project will become a sub-task within this larger "Expand HydroXC" task.	Q3	Complete
Review Statement Of Work (SOW) from contractor.	Q4	Completed
For sub-task "FLDVIEW Data Interface (XML)", conduct complete four stage HOSIP project to be delivered to AWIPS (milestone details TBD at this time).	Q1 – Q2, FY06	Canceled
Survey RFCs on XML usage and needs and publish report of findings.	Q1, FY06	Completed
Obtain more data examples from HydroXC members	Q1, Q2 FY06	Completed
Conduct 2 to 3 HydroXC member workshops	Q1 – Q2, FY06	Completed
Initiate Phase 3 of the contract	Q1, FY07	Completed
Develop more detailed sub-schemas	Q2, FY07	Underway
Publish sub-schemas on web site	Q2, FY07	Not started
Deploy the hydroxc.org website	Q3, FY07	Completed
Develop adapter to read/write defined SHEF messages	Q3, FY07	Underway
Integrate adapter into existing application	Q4, FY07	Not started

Accomplishments/Actions

1st Quarter FY05
- We completed project identification, budgeting, and planning.

2nd Quarter FY05
- Phase 2 of the HydroXC work was not started yet as Phase 1 work from FY04 continued this quarter. It looks like this FY05 Phase 2 work will commence in the 4th quarter.

3rd Quarter FY05
- The SOO for the overall HydroXC work, started in FY04, was completely updated to add Phases 2, 3, and 4 on top of the existing Phase 1 work which has nearly concluded as of June 30.
- The requirements to define and construct the HydroXC-compliant XML data interface between FLDWAV and FLDVIEW were written into the revised SOO.
- The revised SOO was submitted to Contracts and we are awaiting award.

4th Quarter FY05
- SOWs submitted by two prime contractors.
- RTi SOW chosen and accepted by Government.
- Phase 2 of HydroXC work began late in Q4.

1st Quarter FY06
- Developed questionnaire for the RFC XML Usage Survey
- Contacted all participating RFCs and conducted survey
- Collected five new data examples from HydroXC members
- Report on findings from RFC XML Usage Survey delivered

2nd Quarter FY06
- Delivered the final version of the FLDWAV - FLDVIEW HydroXC-compliant data exchange schema.
- Held a HydroXC Workshop to present the HydroXC version 2.0 design and schema for a FLDWAV-FLDVIEW data exchange.
- Held a HydroXC Workshop to present and discuss examples of XML development by Consortium members.
- Modeled example data from RFCs and other Consortium members into version 2.0 of the HydroXC Schema.
- Delivery of final versions of documents and completion of Phase 2 expected early 3rd Quarter.
- Begin planning for Phase 3 of HydroXC during Q3 of FY06.

3rd Quarter FY06
- Phase 2 was successfully completed with the delivery of final versions of documentation and the completion of the following activities:
    - Delivered the final version of the FLDWAV - FLDVIEW HydroXC-compliant data exchange schema.

    - Held two HydroXC Workshops to present the HydroXC version 2.0 design and schema for a FLDWAV - FLDVIEW data exchange, as well as to present and discuss examples of XML development by Consortium members.

    - Modeled example data from RFCs and other Consortium members into version 2.0 of the HydroXC Schema

- A Statement Of Objects (SOO) was released on June 9, 2006 in order to expand development of HydroXC into its third phase.

4th Quarter FY06
- Phase 2 was completed in Q3. Q4 was spent on hiatus while NOAA Procurement processed the contract task request for Phase 3.
- Phase 3 was able to start at the end of Q4.

1st Quarter FY07
- OHD's contractor (Apex) held a kick-off meeting for Phase 3 on December 1
- Dr. Michael Piasecki (Drexel) and OHD met with the contractor to review a draft schedule of activities. Dr. Piasecki has agreed to become the technical leader for the consortium.

2nd Quarter FY07
- Dr. Michael Piasecki continued to work on version 3.0 of the HydroXC schema. In March Apex hosted two workshops to provide consortium members with a preview of the sub-schemas.
- Apex began development of an adapter which is capable of reading and writing SHEF .B messages and generating HydroXC-compliant XML.
- Apex launched the new www.HydroXC.org website at the end of March.

Problems Encountered/Issues

1st Quarter FY05
- This CHPS AHPS project plan/report will cover the sub-task FLDVIEW Data Integration (XML) as soon as the FLDVIEW Data Integration (XML) requirements are incorporated into this CHPS project.
- The allotted funding for the FLDVIEW Data Interface (XML) sub-task is well under what is required to complete the sub-task. It will only get started in FY05 and must get completed in FY06 pending FY06 financial support.

2nd Quarter FY05
- The XML phase 2 task will be scoped out closer to the end of the phase 1 of this task. In phase 1 (FY04 funded) we are working with several agencies to propose an XML schema for communicating data. We will be holding a workshop in May-June to discuss this schema, for participants in the HydroXC. In order to retain the inter-agency flavor (and not overwhelm our cooperators with NWS enthusiasm) we plan to limit NWS participation in the workshop. Prior to the workshop however, we will hold an NWS teleconference to be certain we collect input from those not here in Silver Spring.

3rd Quarter FY05
- The HydroXC workshop, intended for Spring 2005, was delayed out of Q3 because of OHD resource constraints and scheduling difficulties among the Consortium members.
- A series of three workshops focusing on different Consortium members and their data examples is now planned for the last two weeks in July 2005.

4th Quarter FY05
- Slow processing by Contracts created late Q4 award of Phase 2 work but it is now underway in earnest.

1st Quarter FY06
- None

2nd Quarter FY06
- The work on this project, funded by the FY 2005 AHPS budget, will be completed as Phase 2 wraps up in early April 2006. There will be a Phase 3 scoped out and begun during Q3 but it will be funded elsewhere, not from FY 2006 AHPS, which did not provide any follow-on funds.

3rd Quarter FY06
- None.

4th Quarter FY06
- None, other than waiting about one whole quarter for NOAA Procurement to award the Phase 3 contract.

1st Quarter FY07
- None

2nd Quarter FY07
- There is still a high level of reluctance by consortium members to engage in practical activities. Without support from other partners, activities by the HydroXC will be very limited (with a strong OHD focus) and of little use to the consortium as a whole. OHD must find a way to secure participation from other consortium members, or end the project.

Community Hydrologic Prediction System (CHPS)

Theme: Software Architecture Enhancements

Management Lead: Jon Roe

Objective: Provide an improved software infrastructure for operational use at RFCs, as a replacement for the existing NWSRFS, and which will meet the future forecasting needs of all RFCs.

Milestones

Task	Due Date	Status
1. Implement a minimally capable working demonstration ("pilot") at one RFC of a modernized river forecast using WL | Delft's Flood Early Warning System (FEWS)	Q3, FY07	Started
2. Extend the FEWS pilot to cover more basins at the pilot RFC	Q4, FY07	Started
3. Implement the FEWS pilot at other RFCs	Q4, FY08	Started
4. Identify features required to make the FEWS pilot more useful in RFC operations	Q4, FY07	Not Started
5. Develop new and/or expand some of the following features for the FEWS pilot. Examples: i. evaluate and design calibration tools (potentially port ICP into FEWS environment) ii. evaluate and design verification tools (migrate legacy if needed) iii. evaluate and design Ensembles hindcaster, pre-processor, V&V iv. evaluate and design a distributed modeling capability that will accommodate future extensions such as a snow model, new frozen ground model, probabilistic distributed modeling v. research a grid editor for FEWS vi. evaluate and design OHD's new Frozen Ground model (lumped) vii. identify additional services as needed (e.g., Index Velocity Ratings)	Q4, FY08	Item (vi) to be included in Task 1. Otherwise: Not Started
6. AWIPS II migration: design a solution for the FEWS pilot which operates in an AWIPS II environment (ADE)	Q4, FY07	Started

Accomplishments/Actions

1st Quarter FY07
- Key minimum requirements for demo system were defined. RFCs/basins were selected for the pilot. Draft versions of the HOSIP Concept of Operations (CONOPS) and Plan documents, co-developed by RTi and Delft, were delivered. HOSIP Gate 2/Gate 3 (combined) is expected to be held in January.
- The original plan for the pilot was to demonstrate functionality at one RFC. The CAT members agreed that there would be greater value using 2 RFCs rather than one. This means that Task 3 (Implement the FEWS pilot at other RFCs) has effectively begun.
- For risk reduction purposes, OHD also fired up a small team of developers to implement the new Heat Transfer version of the SAC-SMA/Frozen Ground model as part of the pilot demonstration. Work on this sub-project has begun.
- OHD installed the first version (0.0) of ADE locally, and began investigation of its capabilities and features. Several OHD developers, including the CHPS SOA expert, will attend ADE training in January 2007.

2nd Quarter FY07

- The CHPS FEWS Pilot project successfully passed HOSIP Gates 1 and 2 in January.
- In February OHD delivered a re-engineered Java version of OHD's new SAC-SMA Heat Transfer (HT) model, with associated adapter source code, to Delft for inclusion in the pilot.
- Delft began the installation and set-up of FEWS at NCRFC and NWRFC in March. A demonstration of the pilot system running at NWRFC is planned for April.
- OHD initiated a new task in March with Apex Digital Systems to conduct an assessment of the FEWS pilot system. The task will begin with the demo at NWRFC in April and is expected to run for 6 months. Apex will work with the pilot RFCs to develop a set of success criteria, and to evaluate the pilot system against those criteria. The assessment will provide information required in order for the CAT and OHD management to make the final decision concerning FEWS for CHPS.
- Jon Roe and Chris Dietz began a series of discussions with Raytheon in March to address the nature of an interface between AWIPS II and CHPS (FEWS). Raytheon expects to begin analysis of the FEWS pilot system in July with a view to identifying future work for OHD and Delft.
- OHD's SOA expert, Sudha Rangan, attended AWIPS Development Environment (ADE) training in January. This places her in the key position of having familiarity with both FEWS and AWIPS II, and will provide OHD with a means to assess Raytheon's proposal.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Collaborative Research

On-going Competitive and Collaborative Research

Theme: Collaborative Research

Management Lead: Pedro J. Restrepo

Objective: Coordinate the evaluation and management of the collaborative grants program

Milestones

Task	Due Date	Status
On-going competitive grants- Renewal	March 2006	Completed

Accomplishments/Actions

1st Quarter FY05
- We received 27 pre-proposals for new competitive grants. There was no money in the budget to award new grants. All proposers were notified and the process terminated.
- We received progress reports from 3 of the 4 on-going competitive grants. As of today, we also hosted a seminar on the research grant from the U. of Arizona. We will be hosting seminars from the U. of Colorado, U. of Iowa and Central Florida University on Monday, February 7.
- We received a proposal for continuation of a collaborative research from Shripad Deo at CIRA. We requested a re-scope of the proposal which was received and is being evaluated

2nd Quarter FY05
- All progress reports for the on-going competitive grants were received and the renewal process was complete and delivered to the Office of Grants.
- We received news of a Congressional earmark for the Read River Basin Institute. The RFA was published one week ago, and in a telephone conversation with the Institute Director (Chuck Fritz) he communicated that he was completing the proposal this afternoon (4/22)

3rd Quarter FY05
- All on-going competitive grants were submitted on-time to the Grants office.
- The non-competitive Red River earmark grant was received by the proponent on-time. OHD evaluated the grant with assistance of two outside reviewers, approved and forwarded the material to the grants office on time.

4th Quarter FY05
- All grants were awarded on time

1st Quarter FY06
- Scheduled presentations for the Grant Principal Investigators to present their annual progress reports

2nd Quarter FY06
- All four grantees gave presentations to OHD in January, and submitted progress reports.
- All grants were renewed on-time

3rd Quarter FY06
- We used Water Resources Initiative funding to increase each grant by $20 K. Additionally, we used $80K to grant the University of Central Florida a one-year extension to adapt the model to the Pascagoula, MS river, in order to extend the area of forecasting of the LMRFC.
- We dedicated $93K to fund 2 graduate fellowships. Both fellowships will be managed through the NOAA-CREST program lead by the City College of New York. One of the fellowships will be

hosted by a NOAA-CREST institution, and the other one will be available to any graduate program in Water Resources and Hydrology in the US.

4th Quarter FY06

- NOAA-CREST was notified of the award, which allows us to proceed to the announcement, evaluation and award of the two student fellowships.
- The four $20K extensions to all grantees, and the $80K extension to UCF were signed.

1st Quarter FY07

- We received 42 proposals for the June Omnibus announcement. The proposals were reviewed for compliance and found four were non-compliant. The remaining proposals are being evaluated by HSMB and external reviewers.
- The 4 on-going research projects are approaching their completion. Their third and final seminar presentation is scheduled for February 16. These projects are:
  - o University of Colorado: "Improving Operational Streamflow Forecasts in the Colorado River Basin" PI Andrew Slater.
  - o University of Arizona: "Parameterization and Parameter Estimation of Distributed Models for Flash Flood and River Prediction with Quantification of Uncertainty" PI Hoshin Gupta.
  - o University of Iowa: "Diagnostic Verification of 6-90 Day Ensemble Streamflow Predictions for AHPS" PI Allen Bradley
  - o University of Central Florida: "Tides and Waves for the National Service River Forecast System" PI Scott Hagen

2nd Quarter FY07

- Recommended one proposal for award in the Social Sciences category of the December 27 2006 Federal Register Omnibus announcement. No proposals were deemed suitable for funding in the River Regulation category.
- The 40+ proposals received in response to the June Omnibus announcement are in final review. The panel should meet on 4/20

Problems Encountered/Issues

1st Quarter FY05

- Apart from the reduced amount of funding, there have been no problems

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05- None

1st Quarter FY06 - None

2nd Quarter FY06 - None

3rd Quarter FY06 - None

4th Quarter FY06

- None on our side. The award to AZ and the $80K extension to UCF had some glitches that were resolved at the last minute.

1st Quarter FY07 - None

2nd Quarter FY07 - None

Basic Service Implementation

AHPS Implementation APRFC

Management Lead: Scott Lindsey, APRFC

Objective: To calibrate data sparse basins in NWSRFS and validate quality of resulting probabilistic forecasts generated at those locations to allow future implementation as advanced hydrologic prediction services (AHPS) points; recalibrate basins whose forecast performance has been poor; implement AHPS at ~~nine~~ seven new locations.

Milestones

Task	Forecast Points Planned	Due Date FY07	Actual to Date (2nd Qtr FY07)	Status	Variance
Identify 9 locations for AHPS implementation this FY		1st Qtr		Completed	
Identify potential basins for new calibrations		1st Qtr		Completed	
Recalibrate existing non-AHPS basins to utilize new data sources and improve forecast performance		3rd Qtr			
Implement 9 new AHPS points	~~9~~ 7	4th Qtr	3		4
Total	**~~9~~ 7**		**3**		**4**

Accomplishments/Actions

1st Quarter FY07
- Identify 9 new AHPS points that will be implemented this fiscal year.
- Identify 6 new basins to calibrate. Begin data collection and analysis.
- Identified previously calibrated basins (non-AHPS points) that have not performed well. Began calibration process to add new data sources and improve model parameters.

2nd Quarter FY07
- The APRFC requirement for AHPS points has been reduced from 9 to 7. Of that total, 3 sites have been implemented thus far.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Snow Water Equivalent Data

Management Lead: Larry Rundquist, APRFC

Objective: Acquire high quality, high resolution airborne gamma radiation snow water equivalent for flight lines in Alaska; this should improve accuracy and lead time of hydrologic forecasts by providing high quality input to forecast operations in data sparse areas

Milestones

Task	Due Date	Status
Ingest 07 flightline data into archive database	5/07	
Compare period of record for flightline data (2003-2007) with nearby snowcourse sites to see if data are consistent	8/07	
Attempt to use flightline data in Snow updating system if data are sufficiently consistent and correlated with long-term snow course sites	FY08	

Accomplishments/Actions

1st Quarter FY07
- Activities are on target

2nd Quarter FY07
- Activities are on target… coordinated timing and priorities of flight lines with NOHRSC.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Rating Curves for New Service Locations

Management Lead: Larry Rundquist, APRFC

Objective: Provide rating curves at locations where stage is currently measured on either a daily or hourly basis that are adequate to allow the implementation of a hydrologic model and provide forecast information in the future.

Milestones

Task	Due Date	Status
Identify locations where stage data is available and where rating curves might be developed.	2nd quarter FY07	Done
Plan fieldwork to obtain survey information and flow measurements for 4 sites during summer of 2007	3rd quarter FY07	
Analyze field data and develop initial rating curves for 4 new sites	4th quarter FY07	

Accomplishments/Actions

1st Quarter FY07
- None… on target

2nd Quarter FY07
- We have reviewed the status of our rating curves and outlined which forecast points need additional flow measurements and surveys during 2007. We have scheduled field work that will efficiently collect data for as many sites as we can from our priority list.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

AHPS Implementation for NCRFC

Management Lead: Dan Luna, HIC/NCRFC

Objective: Implement probabilistic hydrologic forecasts for basins in the North Central River Forecast Center's (NCRFC) area of responsibility

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
Mississippi R above the Missouri R.	26	1st Qtr	26	0
			6	+6
Total	**26**		**32**	**+6**

Accomplishments/Actions

1sr Quarter FY07
- Twenty-six probabilistic hydrologic forecasts for basins in the NCRFC implemented based on revised implementation criteria

2nd Quarter FY07
- Added the following points
  - Franklin WI - Root R
  - Burlington WI - Fox R
  - Champion MI - Peshekee R
  - Witch Lake MI - Michigamme R

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

AHPS Implementation for MBRFC

Management Lead: Tom Gurss, DOH/MBRFC

Objective: Implement probabilistic hydrologic forecasts for basins in the Missouri Basin River Forecast Center's (MBRFC) area of responsibility. The MBRFC goal is to have 40 additional AHPS points implemented for long-term forecasts by the end of FY 2007.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
Reservoir Inflows in Dakotas, James, Mo Tribs and Grand	14	2nd Qtr	14	0
Portions of Elkhorn, Loup, Milk, and South Platte	18	4th Qtr	0	-18
Total	**32**		**14**	**-18**

Accomplishments/Actions

1st Quarter FY07
- Reservoir calibrations complete. Development of configuration files to produce products has begun. Calibration of river sites ongoing.

2nd Quarter FY07
- Implemented on Dakotas, James, Mo Tribs and Grand

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

AHPS Implementation for MARFC

Management Lead: Peter Ahnert (HIC/MARFC), Joe Ostrowski (DOH)

Objective: Implement probabilistic hydrologic forecasts for basins in the Middle Atlantic River Forecast Center's (MARFC) area of responsibility. MARFC implemented basic AHPS for existing forecast points in the entire MARFC area of responsibility by the end of FY 2006.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
Delaware River Basin	2	1st Qtr. FY07	3 (1st QtrFY07)	+1
Total	**2**	**FY07**	**3**	**+1**

Accomplishments/Actions

1st Quarter FY07
- 3 new AHPS points implemented in the Delaware basin: Harvard, Bridgeville and Neversink Reservoir. AHPS web site now has 30-day probabilistic forecasts for all 3 locations and 30/60/90 day inflow forecasts for the Neversink Reservoir.

- Additional QPF vs. MAP file-sets were provided to OHD for enhancing the conditional distribution function used in the PQPF project.

- Ensemble Verification System activities:

  - Participated in a one-day meeting with OHD to learn about the EVS.

    - Feedback provided to OHD for system improvements

  - OHD provided EVS prototype software to MARFC for installation and implementation.

    - MARFC provided additional data to OHD for EVS system shakedown

  - Attend 3-day Short-Term Ensemble Project workshop 11/28-11/30

- Continuing to provide 9-day forecasts to the Interstate Commission on the Potomac River Basin (ICPRB) for low-flow forecasting

  - Working with OHD on implementing the Ensemble Post-Processor to quantify and apply error corrections for improving low-flow forecasts (since MARFC modeling is geared toward flood forecasting)

- Attended NWS-NYCDEP coordination meeting at NWS BGM office

  - Data flow and service coordination discussed

- Discovered problem with ESPADP software which prevented interactive use at MARFC

  - Due to number of OFS Forecast Groups defined in MARFC's OFS files
  - Code fix identified, applied on beta-version at MARFC, and coordinated with RFC Support Group for inclusion in future ESPADP version

2nd Quarter FY07

- MARFC has made progress using NWSRFS Error models in adjusting very low flow simulations. Additional work is required to determine the best error model and calibration scheme, but they are able to make runs using all 3 available error models. This will be very important if low flows are encountered this summer, particularly in the Potomac where there is heightened focus when low flows occur.

Problems Encountered/Issues

1st Quarter FY07 – None

2nd Quarter FY07 – None

AHPS Implementation for NERFC

Management Lead: David Vallee (HIC/NERFC), Robert Shedd (DOH)

Objective: Implement probabilistic hydrologic forecasts for basins in the Northeast River Forecast Center's (NERFC) area of responsibility.   The NERFC goal is to have AHPS implementation for long-term forecasts for the entire NERFC area of responsibility by the end of FY 2009.

Milestones

Implementation Area	Forecast Points Planned *	Due Date FY07	Actual to Date (2nd Qtr FY07)	Variance
Connecticut River	4 *	4th Qtr.	0	0
Hudson River Basin	2 *	2nd Qtr.	0	0
Maine	3 *	2nd Qtr.	0	0
Southern New England	5 *	4th Qtr.	1 (1st Qtr FY07)	0
Total	**14 ***	**FY07**	**1**	**0**

* To be revised

Accomplishments/Actions

1st Quarter FY07
- The following location(s) have now been implemented on the Web as AHPS points: Dover, MA (DOVM3) on the Charles River in the southern New England basin area. This is an existing forecast point that has been converted to the Sacramento model, and where long-term probability forecasts through ESP are now available.
- Work is continuing with RTi on the calibration activities in the Connecticut River Basin. They plan on being largely complete by early January FY07. NERFC is planning a trip to Ft Collins, CO in Jan. 2007 to review the work by RTi.
- NERFC staff is continuing in-house calibration on Maine and southern New England rivers.
- NERFC has started a process to review existing AHPS calibrations to monitor where modifications may be required.
- Changes were recently made to the NERFC AHPS Web Page to include nationally consistent top and left-hand side menu bars as well as new graphics on the Main Page.

2nd Quarter FY07
- NERFC has accepted the RTi final report for their FY06 task on calibration of Connecticut River tributaries. They should begin the implementation of these shortly.

- NERFC will soon begin working with RTi on setting up a new task order for the FY07 budget. This will again involve work in the Connecticut River basin

- NERFC is continuing in-house progress on local calibration efforts in Maine and Southern New England.

- NERFC is currently involved in three significant development activities in order to enhance their services:

   (1) They have been ingesting data from Canadian radars into the MPE process since early

January. They are currently receiving data from four (4) radars. These procedures have been shared with other RFCs and WFOs who are interested.

(2) NERFC has been using 925mb model temps to enhance their forecast temperatures in basins that are subdivided into lower and upper elevation zones. This should improve their modeling of snow melt in these regions. Current procedures have either applied the same temperature to both upper and lower zones, or have used a simple lapse rate which is not always realistic.

(3) They are in the process of developing procedures to ingest NCEP ensembles members (currently GFS, plan SREF when available) and run these thru NWSRFS ESP. NERFC is hoping to use these to support 0-5 day probabilistic contingency forecasts.

Problems Encountered/Issues

    1st Quarter FY07 – None

    2nd Quarter FY07 – None

AHPS Implementation for OHRFC

Management Lead: Craig Hunter (HIC/OHRFC), Tom Adams (DOH)

Objective   Implement probabilistic hydrologic forecasts for basins in the Ohio River Forecast Center's (OHRFC) area of responsibility. The OHRFC implemented basic AHPS for all existing long-term forecast points in the OHRFC area of responsibility by the end of FY 2006.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
	0		0	0
Total	**0**	**FY07**	**0**	**0**

Accomplishments/Actions

1st Quarter FY07
- OHRFC has completed basic AHPS implementation for its entire service.
- They are currently in a re-calibration/maintenance phase. OHRFC is presently working on re-calibrating the Little Wabash R.
- The OHRFC implemented a Water Resources Outlook (WRO) product (Sep. 2006) based on expected monthly average mean daily flows for the 0—30, 30–60, and 60–90 day periods from ESP runs. Additional work to enhance this product is underway. Products will be issued as CRWESGTIR on a monthly basis and as a graphical web-based product, which will show basin (Forecast Group) and forecast point color coded maps.
- OHRFC participated in a USGS/USACE/NWS Ohio R. Basin Coordination Meeting in Indianapolis, IN. They made a presentation, which included AHPS and the planned WRO product.
- Work was recently completed to include the generation of low-flow probability graphics of instantaneous minimum flows and for weekly mean flows.

2nd Quarter FY07
- The staff is continuing with re-calibration activity associated with the Little Wabash R. and Green R. basins.
- OHRFC is working on procedures to show graphical web-based map products to depict probabilities of exceedance for forecast points as color coded maps.
- Work was completed in November 2006 to include the generation of low-flow probability of non-exceedance graphics or instantaneous minimum flows and for weekly mean flows. The staff continues to work on including the Q-7-10 levels on the weekly mean flows graphics for reference.

Problems Encountered/Issues

1st Quarter FY07 – None

2nd Quarter FY07 – None

AHPS Implementation for ABRFC

Management Lead: Billy Olsen, HIC/ABRFC

Objective: Implement probabilistic forecasts for basins in the Arkansas-Red Basin River Forecast Center's (ABRFC) area of responsibility. For FY07, this would include implementation of basic service for 34 AHPS forecast locations in the following ABRFC forecast groups: Washita Basin and Lower Arkansas River-Kerr to Pine Bluff. Also, perform reservoir calibration for four reservoirs in Southeast Kansas. These reservoirs are currently implemented for basic service; however, the reservoirs are currently set to simply pass historical discharges in ESP runs.

Milestones

Implementation Area	Forecast Points Planned	Due Date FY07	Actual to Date 2nd Qtr FY07	Variance
Washita Basin	3	Sep 2007	0	0
Lower Arkansas River - Kerr to Pine Bluff	19	Sep 2007	0	0
Toronto, Fall River, Elk City and Big Hill Reservoirs in Southeast Kansas*	---	Sep 2007	---	---
* Reservoirs are being "re-calibrated"				
Total	**22**	**Sep 2007**	**0**	**0**

Accomplishments/Actions

1st Quarter FY07

- Completed RTi FY-06 Reservoir Calibration Project. RTi visited ABRFC for two days to deliver and explain their work, to provide staff training on RESJ and to discuss future reservoir calibration activity.

- Participated in three CHPS Acceleration Team (CAT) meetings with RTi, Delft and others concerning the FEWS Pilot test.

- Provided comments to OHD concerning FEWS Pilot Project documents.

- Participated in monthly ARC conference call.

- Appropriate AHPS operational forecasts for December will be (Dec. 28) and October/November were made and disseminated.

- Work continues on the Short Term QPF Ensemble Forecast project in coordination with OHD.

- Work continues on the DHMS implementation and coordination with OHD. Several local meetings and one conference call held with OHD, WGRFC and SRH.

- Work continues on the verification for various types of AHPS forecasts. Local meeting held concerning more rigorous verification/validation of distributed model performance at ABRFC.

- Local meeting on ABRFC Gridded FFG held to discuss science issues raised by OHD.

- Participated in a conference call with OHD in regards to AHPS/WRI/etc project planning.

- Participated in Flash Flood Guidance Theme Team conference calls and budget deliberations.

- Participated in the Short to Long-term Forecast Theme Team Conference calls and budget deliberations.

- Reviewed the AHPS Theme Team's draft recommendations for funding projects.

- Submitted the AHPS quarterly report and monthly reports as appropriate..

2nd Quarter FY07
- Began market research for FY-07 contractor reservoir calibration project.
- Submitted an FY-07 draft SOO to RTi for comment.

Problems Encountered/Issues

1st Quarter FY07
- ABRFC FY-2007 AHPS Reservoir Calibration Project on hold until funding picture becomes clearer.

2nd Quarter FY07
- Still awaiting action by OHD to correct a bug in the ts2oh executable that cropped up with OB7.1.
- Based on recommendation from OHD due to budget issues, lowered the number of points to be implemented this year by 12.

AHPS Implementation for LMRFC

Management Lead: Dave Reed, HIC

Objective: Implement probabilistic hydrologic forecasts for basins in the Lower Mississippi River Forecast Center's (LMRFC) area of responsibility.

Milestones:

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 1st Qtr FY07	Variance
Yazoo Basin - Coldwater	2	12-31-06	2	0
- Tallahatchie	3	12-31-06	3	0
- LittleTallahatchie	1	03-30-07	1	0
- Yocona	1	03-30-07	1	0
- Skuna	1	03-30-07	1	0
- Yalobusha	2	03-30-07	2	0
- Yazoo	3	06-30-07		
- Big Sunflower	2	06-30-07		
Big Black Basin	3	09-30-07		
Homochitto Basin	1	09-30-07		
Pearl Basin	4	09-30-07		
Total	**23** **		**10**	

** FY07 Total reduced from 29 to 23 due to decrease in AHPS funding.

Accomplishments/Actions

1st Quarter FY07
- The FY06, T6-0004 Final Report was received and approved by the HIC during October.
- Implemented 5 AHPS sites during December: SARM6, MKSM6, LMGM6, LOGM6, and SWNM6 for WFO MEG.
- FY07 market research preparations have begun. Call with Contractor is planned during January.
- Completed initial cut of draft SOO for FY07 and for Task T6-0011.
- Received AHPS base funding support of $152k for FY07.
- Data collection for FY07 contractor calibration continues. This should be completed around mid-to-latter February.
- Completed one local calibration for PSPT1.
- A total of 13 historical MAPs were completed during the 1st Q.
- LMRFC continues support of AHPS activities with in-house calibration effort for basins in West Tennessee; and, for downstream locations in the Yazoo Basin.

2nd Quarter FY07
- Due to a decrease in AHPS funding, the number of sites to be implemented in FY07 have been reduced from 29 to 23.
- Completed market research with RTi. Draft SOO for FY07 and Task T6-0011 reviewed by RTi and sent to NWS COTR for approval and processing. COTR approval is pending.
- Completed compilation of all required FY07 historical datasets for RTi.
- Implemented 5 new AHPS sites in the Yazoo Basin: ETAM6, OXDM6, BRCM6, CCTM6, and YWGM6. Five (5) are scheduled for implementation during the 3rd Quarter.

- Initial plans are under way for FY08 AHPS/calibration activities.
- May 8-9, AHPS outreach scheduled for WFO JAN.
- Historical MAPs were completed for the Amite/Comite basins and are currently being developed for the Vermilion Basin.
- No in-house basin calibrations completed during the 2nd Quarter.
- LMRFC continues support of AHPS activities with in-house calibration effort for basins in west Tennessee; and, downstream locations in the Yazoo Basin

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

AHPS Implementation for SERFC

Management Lead: John Feldt, HIC

Objective Implement probabilistic hydrologic forecasts for basins in the Southeast River Forecast Center's (SERFC) area of responsibility. For FY07 this would complete AHPS sites in portions of South Carolina and Georgia.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
Santee	1	1st Qtr	0	-1
Savannah	6	1st Qtr	7	+1
	3	2nd Qtr	2	-1
Altamaha	4	2nd Qtr	5	**+1**
	5	3rd Qtr		
	0	4th Qtr		
Total	**19**	**FY06**	14	**0**

Note: Planned site in Santee River basin not completed in Qtr 1 will be done later in FY07.

Accomplishments/Actions

1st Quarter FY07
- RTi visited SERFC on November 15, 2006 and presented their completed work under the FY05 AHPS contract.

2nd Quarter FY07
- The SOO for FY07 contract AHPS work has been submitted.
- John Feldt and Todd Hamill attended a CI-FLOW meeting Feb. 27 – Mar. 1 in Charleston, SC. Topics of discussion included Tar River inundation mapping, distributed modeling, and estuary/coastal modeling applications.

Problems Encountered/Issues

1st Quarter FY07 – None

2nd Quarter FY07 – None

AHPS Implementation for WGRFC

Management Lead: Thomas Donaldson, WGRFC

Objective: Implementation of probabilistic hydrologic forecasts for the West Gulf River Forecast Center (WGRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (1st FY07)	Variance
Sabine	17	4th Qtr	0	0
Lavaca / Navidad,	4	4th Qtr	0	0
San Bernard	3	4th Qtr	0	0
Total	**24**			

Accomplishments/Actions

1st Quarter FY07

- Completed RESJ calibration for reservoirs in the Sabine River Basin.
- Completed MAP and MAPX timeseries for 2007 implementation areas.
- Began local calibration for 2007 implementation areas.
- Provided contractor with parametric and historical data specified in the task order:
  - WGRFC fs5files
  - ESRI shapefile of forecast location and basin boundaries
  - Computed MAPX timeseries
  - Historical instantaneous and mean daily flow timeseries
- Received historical reservoir information from the Brazos River Authority and the Corps of Engineers for reservoirs in the Brazos River Basin.
- Began local RES-J reservoir calibration for reservoirs in the Brazos River Basin.

2nd Quarter FY07

- Developed AHPS training power point presentation targeted for WFOs and high end users.
- Reviewed unit hydrographs developed by RTi and provided comments back to the contractor.
- Compiled data availability information for the Brazos River Basin in preparation for market research
- on FY 07 calibration contract.
- Continued RESJ calibration for reservoirs in the Brazos River Basin.
- Continued local SAC-SMA calibration efforts.
- Adjusted FY 07 implementation to reflect 6 fewer forecast points.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

AHPS Implementation for CBRFC

Management Lead: Michelle Schmidt, HIC/CBRFC

Objective: Implement probabilistic hydrologic forecasts in the Colorado Basin River Forecast Center's (CBRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
Colorado Basin	14	4th Qtr	0	0
Total	**14**		0	0

Accomplishments/Actions

1st Quarter FY07
- Sites are calibrated. Still need to produce graphics for the AHPS web page.

2nd Quarter FY07
- Sites are calibrated. Still need to produce graphics for the AHPS web page

Problems Encountered/Issues

1st Quarter FY06 - None.

2nd Quarter FY07 - None.

AHPS Implementation CNRFC

Management Lead: Robert Hartman, HIC/CNRFC

Objective: Implement probabilistic hydrologic forecasts in the California-Nevada River Forecast Center's (CNRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
Upper and Lower Sacramento River	0	9/30/07	0	0
Total	0			

Accomplishments/Actions

1st Quarter FY07
- Continuing operational ESP implementation for points on the Upper and Lower Sacramento River system. CNRFC held two workshops this fall where, among other things, CNRFC deterministic and probabilistic products and services were presented. Service Hydrologist Workshop Oct 24-25, 2006. Water Resource Managers Workshop Oct 26, 2006

2nd Quarter FY07
- Continuing operational ESP implementation for points on the Upper and Lower Sacramento River system.

Problems Encountered/Issues

1st Quarter FY07
- Issue with performing ESP on Controlled Reservoir Release Operations. Tools do not exist to come up with workable probabilistic forecasts for regulated points. We will be recalibrating 22 river forecast points this year. All of them are regulated, therefore, none of these points can be implemented as AHPS points.

2nd Quarter FY07
- Issue with performing ESP on Controlled Reservoir Release Operations. Tools do not exist to come up with workable probabilistic forecasts for regulated points. We will be recalibrating 22 river forecast points this year. All of them are regulated, therefore, none of these points can be implemented as AHPS points.

AHPS Implementation for NWRFC

Management Lead: Harold Opitz, HIC/NWRFC

Objective: Implement probabilistic hydrologic forecasts in the Northwest River Forecast Center's (NWRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2nd Qtr FY07)	Variance
NWRFC Area	58	4th Qtr	0	
Total	**58**			

Accomplishments/Actions

1st Quarter FY07
- Sites are calibrated. Still need to produce graphics for the AHPS web page.

2nd Quarter FY07
- Sites are calibrated. Still need to produce graphics for the AHPS web page.

Problems Encountered/Issues

1st Quarter FY06 - None.

2nd Quarter FY07 - None.

Training

RFC/HPC Visiting Forecaster

Theme: Training

Management Lead: Edwin Danaher, HPC Development and Training Branch

Objective: To improve understanding and cooperation between HPC forecasters and RFC hydrologists

Milestones

Task	Due Date	Status
1.Revise agenda for RFC visitors to HPC and HPC visitors to RFCs.	February 2007	Completed
2. Schedule and implement visits.	September 2007	On Schedule

Accomplishments/Actions

1st Quarter FY07
- Began planning for FY07 visits
- Sent announcement of program to regions

2nd Quarter FY07
- Selected RFCs to participate
- Scheduled first two visits.

Problems Encountered/Issues

1st Quarter FY07 - None

2nd Quarter FY07 - None

Hydrologic Science Training - COMET

Theme: Training

Management Lead: Jeff Zimmerman

Objective: Develop training and education materials to facilitate the implementation of new science and technologies into hydrologic operations.

Milestones

Task	Due Date	Status
Conduct Flash Flood Hydrology/QPE Workshop	2nd Q	Complete
Conduct Advanced Hydrologic Science Residence Course	3rd Q	On-going
Deliver Flash Flood Processes Distance Learning Module	1st Q	Complete
Deliver River Ice Processes Distance Learning Module	1st Q	Complete
Deliver Snowmelt Processes Web Cast	2nd Q	Complete
Deliver Introduction to Ensemble Streamflow Prediction Web Cast	2nd Q	Complete
Deliver River Forecast Case Study	2nd Q	Expected in May
Deliver teletraining to introduce Basic Hydro Science components	3rd Q	Complete
Deliver Dambreak Distance Learning Module	4th Q	On-going
Deliver Verification Distance Learning Module	4th Q	On-going
Deliver Distributed Hydrologic Model Distance Learning Module	4th Q	On-going

Accomplishments/Actions

1st Quarter FY07
- Delivered Flash Flood Processes and River Ice Processes Distance Learning Modules
- Conducted several conference calls to discuss and plan implementation of Advanced Hydrologic Science Residence Course
- Conducted introductory conference call on the Dambreak distance learning module

2nd Quarter FY07
- Delivered Flash Flood Hydrology/QPE Workshop
- Delivered teletraining to introduce Basic Hydrologic Science curriculum
- Published webcast on basics of Ensemble Streamflow Prediction
- Published Snowmelt Processes module
- Continued work on the development of the Dam Failure module

Problems Encountered/Issues

1st Quarter FY07 - **None**

2nd Quarter FY07
- The River Forecast Case Study is expected to be published in May

RFC/WFO Training

Theme: Training

Management Lead: Jeff Zimmerman

Objective: Provide a basic level of knowledge and understanding for WFO staff regarding the implementation of AHP services in their Hydrologic Service Area.

Milestones

Task	Due Date	Status
WFO/RFC Workshop NERFC/Western NY/Connecticut River Basin	4th	Deferred to regional workshop
WFO/RFC Workshop OHRFC	4th	Deferred to regional workshop
WFO/RFC Workshop MARFC/Delaware Basin/Virginia	4th	Deferred to regional workshop
ER AHPS Training Workshop	3rd	On schedule
WFO/RFC Workshop NCRFC/FGF	3rd	On schedule
WFO/RFC Workshop OHRFC/JKL	3rd	On schedule
WFO/RFC Workshops NCRFC/GRB	4th	On schedule
WFO/RFC Workshop MBRFC/NCRFC/FSD	3rd	On schedule
WFO/RFC Workshop with LMRFC	2nd/3rd	On schedule
WFO/RFC Workshop with SERFC	3rd/4th	On schedule
WFO/RFC Workshop with WGRFC	3rd/4th	On schedule
WFO/RFC Workshop with ABRFC	4th	On schedule

Accomplishments/Actions

1st Quarter FY07
- None

2nd Quarter FY07
- Provided accounting code information to Regions
- Finalized Work Plan
- Eastern Region modified original plan to conduct one Regional AHPS Training Session in April

Problems Encountered/Issues

1st Quarter FY07
- FY 07 funding was not made available for this activity until the 2nd Quarter of FY 07
- Funding code information provided on January 23, 2007
- Requested updates to work plan by February 8, 2007

2nd Quarter FY07
- None

Outreach

FY07 AHPS Outreach Work Plan

Theme: AHPS Outreach

Management Lead: Tom Graziano, Larry Wenzel, Regional HSD Representatives

Objectives: Accomplish outreach with national, regional, and Locational partners and customers with Locational emphasis on Locations where AHPS is being or will soon be implemented Develop clear and consistent AHPS outreach materials for use by national, regional, and Locational personnel

Milestones

Tasks	Org	Cost	Due Date	Status
National Safety Council Annual Congress and Expo (San Diego, November 2006) - For general information see: http://www.eshow2000.com/nsc/home.cfm - OCWWS HSD staff will host a NWS booth with WFO San Diego	OCWWS	7,000	Q1	Completed
AGU Fall Meeting (San Francisco, December 2006) - For general information see: http://www.agu.org/meetings/fm06/ - NWS personnel will present in Session on Scenario Planning for Water Resources Management - http://www.agu.org/meetings/fm06/?content=search&show=detail&sessid=348 - OCWWS HSD, OHD, and WR personnel will host a NWS booth	OCCWS	5,000	Q1	Completed
ASFPM Annual Conference (Norfolk, VA, June 2007) - For general information see: http://www.floods.org/Conferences,%20Calendar/confer.asp - Plan is to send 2 OCWWS/HSD and 2 Regional personnel - OCWWS HSD and participating regions will host a NWS booth	OCWWS	8,000	Q3	In Progress Q3
National Hydrologic Warning Council Biennial Conference (Savanah, Ga, June 2007) - For general information see: http://nhwc.udfcd.org/PDF/ConferenceAnnouncement2007.pdf - Plan is to send 2 OCWWS/HSD and 2 Regional personnel - OCWWS HSD and participating regions will host a NWS booth	OCWWS	5,300	Q3	In Progress Q3
Joint NWS Flood Safety/FEMA FloodSmart Brochure	OCWWS	4,000	Q4	Completed Q4
Multi-Regional HPM Conference, NWSTC, Kansas City (July 2007) - Conference activities will include a) communicating the NOAA Hydrology Program vision (including AHPS and the Water Resources Program) and the role of HPM's in the implementation of enhanced services; b) sharing ideas and best practices across regional boundaries; c) breakout sessions which address science/service topics of concern to HPMs (e.g., flash floods, drought, distributed modeling, inundation mapping, etc.); d) breakout sessions which address regional issues/topics. - OCWWS/HSD will lead develop of agenda and coordinate speaker participation - CR has reserved the NWSTC auditorium and 5 breakout rooms for week of July 9 - Participating Regions, and headquarters will make establish their own contracts for lodging	OCWWS	8,000	Q4	In Progress Q4
National Safety Council Annual Congress and Expo (Chicago, October 2007)	OCWWS	6,000	Q4	In Progress Q4
Develop new Flood Warning TADD Road Sign with DOT/FHA - Produce 15 Signs and distribute to Regions - Proposed sign is a (yellow) warning sign to supplement existing (pink)	OCWWS	700	Q4	In Progress Q4

Description	Region	Amount	Planned	Status
incident sign - Warning signs are permanently posted (and therefore unlike incident signs do not need to be deployed on an event driven basis) - Sign be deployed in areas characterized by a high incidence and/or rapid onset of flooding				
Reproduction and distribution of the new flood safety video and vignettes to be developed in coordination with The Weather Channel - Video and vignettes will be broadcast nationally - Copies of the DVD will be provided to regions for regional/local flood safety outreach		4,000	Q4	Completed Q4
		48,000		
Participate in quarterly Delaware River Basin Flood Advisory Committee Meetings and review AHPS deployment and operations in the Delaware River Basin.(MARFC); Location TBD	ER	500	Q1	Completed
Participate in semi-annual New York City Water Supply Meetings and review AHPS deployment and operations in the NYC water supply system. (NERFC); Location TBD	ER	500	Q2	Changed from Q2 to FY07 Q3
Participate RFC WFO partnered workshop(s) in the Ohio Valley (OHRFC); Location TBD .	ER	1,000	Q2	Changed from Q2 to FY07 Q3
Participate in quarterly Delaware River Basin Flood Advisory Committee Meetings and review AHPS deployment and operations in the Delaware River Basin (MARFC); Location TBD	ER	500	Q2	Completed
Participate in quarterly Delaware River Basin Flood Advisory Committee Meetings and review AHPS deployment and operations in the Delaware River Basin (MARFC); Location TBD	ER	500	Q3	Q3
Participate RFC WFO partnered workshop(s) in the Ohio Valley (OHRFC); Location TBD	ER	1,000	Q3	Q3
Cosponsor and participate in the WMO Sponsored- Saint John River Hydrology Committee Mtg in Fredrickton, NB Canada. Share AHPs development and deployment activities in northern New England. (NERFC); Location St John RFC in Frederickton, NB, Canada	ER	3,000	Q3	Changed from Q3 to FY07 Q4
Participate RFC WFO partnered AHPS workshops in Virginia; Location TBD	ER	1,000	Q3	Q3
Participate RFC WFO partnered workshop in the Connecticut River Valley to review new AHPS deployment (NERFC); Location TBD.	ER	1,000	Q3	Q3
State Hurricane Conference Support to review AHPS products suites and review inland flooding hydrologic services; Location VA & NC	ER	2,000	Q3	Q3
Develop brochure on NERFC activities and AHPS program in the northeast	ER	1,000	Q3	Q3
Participate in quarterly Delaware River Basin Flood Advisory Committee Meetings and review AHPS deployment and operations in the Delaware River Basin (MARFC); Location TBD	ER	500	Q4	Q4
Participate in semi-annual New York City Water Supply Meetings and review AHPS deployment and operations in the NYC water supply system. (NERFC); Location TBD	ER	500	Q4	Q4
		13,000		
Partnered WFO Pleasant Hill, MO and MBRFC user workshop	CR	200	Q2	Completed Q2
Partnered Jackson, KY and OHRFC user workshop	CR	2,500	Q2	Q3
Partnered Grand Forks and NCRFC user workshop	CR	4,300	Q3	Q3
Partnered Green Bay, WI and NCRFC user workshop	CR	2,500	Q4	Q4
Partnered Sioux Falls, SD and MBRFC user workshop	CR	3,500	Q4	Q3
		13,000		
Partnered WFO/RFC Customer Workshop in the (Sabine River Basin) Location TBD	SR	1,800	Q3	Q3
Partnered WFO/RFC Customer Workshop	SR	1,600	Q3	Q3

in the Lavaca-Navidad River Basin Location TBD				
Partnered WFO/RFC Customer Workshop (COE, USGS, MEMA officials from Ross Barnett Reservoir, Ems, etc) Location WFO Jackson	SR	2,000	Q3	Q3
Partnered WFO/RFC Customer Workshop Audience – water resource partners, EMs, media, other stakeholders; Location WFO Little Rock	SR	1,000	Q4	Q4
MS Water Resources Conference; Location Jackson, MS	SR	1,500	Q3	Completed
Partnered WFO/RFC Customer Workshop; Location GA or FL	SR	3,000	Q4	Q3
National Hurricane Conference; Location New Orleans	SR	2,100	Q3	Completed
		13,000		
Montana specific AHPS brochure/pocket guide	WR	4,000	Q2	In Progress Q4
Install two Idaho information Centers at high visibility recreation locations	WR	5,000	Q3	In Progress Q4
AHPS Kiosk Creation and update at Happy Isles River Gage in Yosemite NP	WR	4,000	Q4	In Progress Q4
		13,000	Q1	
		100,000		

Accomplishments/Actions

1st Quarter FY07
- All milestones are on schedule

2ne Quarter FY07
- HSD: Joint NWS Flood Safety/FEMA FloodSmart Brochure completed and on-line.
- ER: Participated in quarterly Delaware River Basin Flood Advisory Committee Meetings and reviewed AHPS deployment and operations in the Delaware River Basin (MARFC)
- CR: Partnered WFO Pleasant Hill, MO and MBRFC user workshop
- SR: MS Water Resources Conference; Location Jackson, MS
- SR: National Hurricane Conference; Location New Orleans

Problems Encountered/Issues

1st Quarter FY0 - None

2nd Quarter FY07
- Several Milestones have been pushed back one quarter

Program Management

Program Management

Theme: Program Management

Management Lead: Donna Page

Objective: Provide national program management; coordinate and track AHPS budgets and project plans; manage AHPS contracts; and foster Agency, Departmental, and Legislative Interface.

Milestones

Tasks/Subtask FY07 Milestones	Responsible	FY07 Quarter Completion Date
AHPS Planning/ Execution/ Reporting • Theme Plans • Quad Charts • E-CPIC Updates • Earned Value Reports • Quarterly Status Reports	 OHD/HSD/Regions OHD/Regions OHD OHD OHD	 3rd Monthly Quarterly Monthly Monthly
NOAA PPBES Hydrology Program Support • Program Assessment Rating Tool • Program Baseline Assessment • Quad Charts • Quarterly Program Review	 OHD OHD OHD OHD	 2nd 3rd Quarterly Quarterly
Agency/ Department/ Legislative Interfaces • Budget Fact Sheet • Prepare and submit Budget Request • Prepare Briefings and Support OMB/Congressional Meetings • Prepare Response to Pass Back • Prepare Response to Budget Hearing Questions	 OHD OHD OHD OHD OHD	 1st 2nd 3rd 3rd 4th
HOSIP Process Improvement and Document Development • Instructions • Guidance & Standards • Performance Statistics • Quality Control Reports • Gate Status Reports • Validation & Recommendation Reports • HOSIP Documents	 OHD OHD OHD OHD OHD OHD OHD	 Quarterly Quarterly Quarterly Quarterly Quarterly Quarterly Quarterly

Accomplishments/Actions

1st Quarter FY07
- All milestones are on schedule – all scheduled reports have been completed.

2nd Quarter FY07
- All milestones are on schedule – all scheduled reports have been completed
- Contributed to the development of the Program Assessment Rating Tool for the OMB assessment of the Hydrology Program

Problems Encountered/Issues

1st Quarter FY07 - none

2nd Quarter FY07 - none

Web Page Deployment

AHPS Web Page Activities (includes NLRDB)

Theme: Web Page Deployment

Management Lead: Donna Page

Objective: Provide a standard look and feel for the presentation of AHPS hydrologic and forecast information on the World Wide Web by all NWS weather offices. Also, complete the implementation of a single national database that aggregates information on hydrologic observation and service locations used by WFOs and RFCs (National Rivers Location Data Base - NRLDB).

Milestones

Task	Due Date	Status
1. Ongoing support and maintenance web pages and NRLDB	Q2	Ongoing
2. Phase V development	Q2	In progress
3. Infrastructure Evaluation	Q2	Delivered
4. NOAA Watch Page enhancements, HydroGen Efficiency	Q2	Completed
5. Phase VI definition	Q2	Delivered
6. Phase VI development	Q4	In progress
7. Phase VII definition	Q4	On schedule
8. Deployment of static map libraries (development funded by AHPS Dissemination Theme)	Q4	On schedule

Accomplishments/Actions

1st Quarter FY07
- Delivered and supported implementation of core Phase IV deliverables on regional web-farms
- Modified AHPS CMS to resolve potential river database loops. Solution will be implemented with Phase V
- Developed inundation prototype for OCWWS/OHD

2nd Quarter FY07
- Finalized inundation prototype look and functionality
- Deployed inundation prototype for NOAA/NWS review
- Integrated AJAX into national precipitation development pages and AHPS HSA pages
- Developed KMZ output for river observation and forecast data

Problems Encountered/Issues

1st Quarter FY07
- Continued issues with missing products in HQ product database. NWS OCIO is aware of the ongoing issue
- Found issue where WFO users could create a river database loop in the AHPS CMS
- Continued to have intermittent SQL update issues with the cluster database at CRH. Will establish a development cluster database to determine a long-term solution

2nd Quarter FY07
- Continued to have occasional issues with missing products in HQ product database. NWS OCIO is aware of the ongoing issue. Additionally OCIO implemented a new database population process, which did not meet hydrologic text product requirements. OHD worked with OCIO developer to resolve issues.